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MONTANA AIR MONITORING NETWORK REVIEW FOR 1991

Air Quality Bureau
Environmental Sciences Division
Department of Health
and Environmental Sciences
Helena, Montana 59620

October, 1991

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MONTANA AIR MONITORING

NETWORK REVIEW

FOR 1991

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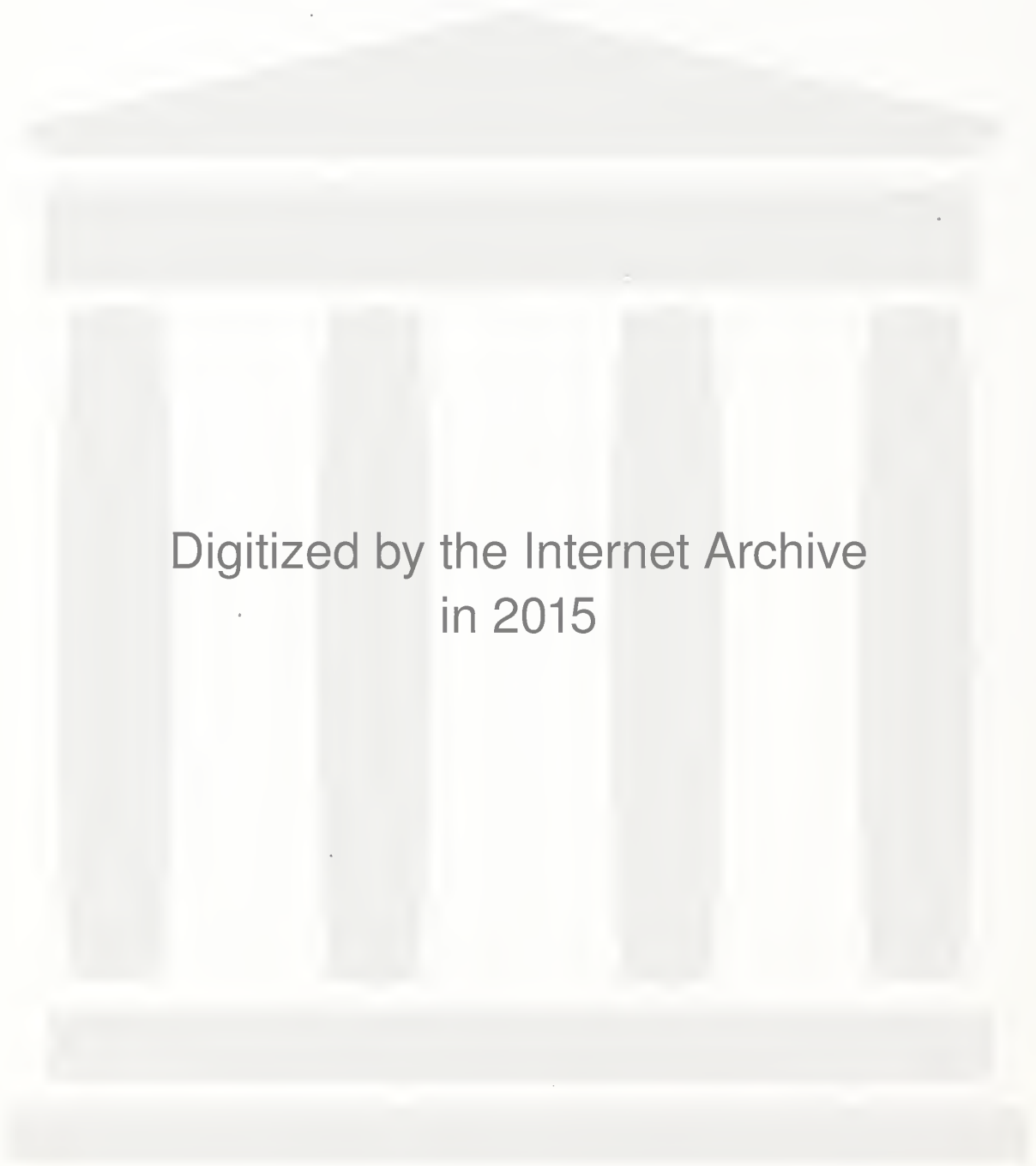
Montana Department of Health and Environmental Sciences
Helena, Montana 59620

October, 1991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MONTANA AIR MONITORING NETWORK REVIEW FOR 1991

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) requires the Montana Department of Health and Environmental Sciences (MDHES) to conduct an annual review of the state's ambient air monitoring network.

The 1991 Network Review follows a format that was developed for the 1990 Network Review. Some enhancements have been added including a list of the current monitoring sites and a projection of equipment needs for the next five years. Each year the department also publishes an air quality data and information summary. This document is available upon request.

EPA's requirements for an annual network review are set forth in 40 CFR 58.20(d). These requirements say that the state must conduct a review (1) to determine if the system meets the monitoring objectives defined in Appendix D of Part 58, and (2) to identify needed modifications of the network, such as the termination or relocation of unnecessary stations or the establishment of new stations that may be necessary.

The department is required by 40 CFR 58.25 to develop and implement an annual schedule modifying the network in order to eliminate any unnecessary stations or to correct any inadequacies indicated by the results of the annual review. The department must consult with the Regional Administrator of EPA during the development of the schedule to modify the monitoring program. The final schedule and modifications are subject to the approval of the Regional Administrator.

This document and subsequent revisions are intended to satisfy those annual requirements.

1.1 NETWORK REVIEW PROCESS

In order to conduct this review, the monitoring objective and the spatial scale of representativeness of each station, existing or proposed, are first examined to determine whether they represent the air quality situation of the area. Background information, such as maps, climatological summaries, emission inventories, traffic counts, and modeling results are gathered and reviewed. The opinions of the department staff, the personnel of the four approved county air pollution agencies, as well as several other county health agencies, and staff members of EPA are also solicited.

In the 1979 Network Review, the department designated each monitoring site in the state as either National Air Monitoring Station (NAMS), State and Local Air Monitoring Station (SLAMS), or Special Purpose Monitoring station (SPM). The NAMS/SLAMS network is designed to meet four basic monitoring objectives. The basic monitoring objectives are as follows:

1. To determine highest concentrations expected to occur in the area covered by the network.

2 To determine representative concentrations in areas of high population density.

3. To determine the impact on ambient pollution levels of significant sources or source categories.

4. To determine general background concentration levels.

The link between the basic monitoring objectives and the physical location of a particular monitoring site involves the concept of spatial scales of representativeness. The spatial scale is determined by the physical dimensions of the air parcel nearest a monitoring station throughout which the actual pollutant concentrations are reasonably similar. The goal in siting stations is to match the spatial scale represented by the sample of monitored air with a spatial scale most appropriate for the monitoring objective. Spatial scales of representativeness, as specified by EPA, are described below:

Microscale - defines the concentrations in air volumes associated with area dimensions ranging from several meters up to about 100 meters.

Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers.

Neighborhood scale- defines concentrations within some extended area of the city that has relatively uniform land use with dimensions in the 0.5 to 4.0 kilometer range.

Urban scale - defines the overall, citywide conditions with dimensions on the order of 4 to 50 kilometers. This scale would usually require more than one site for definition.

Regional scale - defines usually a rural area of reasonable homogeneous geography and extends from tens to hundreds of kilometers.

National and Global scales - these measurement scales represent concentrations characterizing the nation and the globe as a whole.

In order to site a monitoring station properly, both the monitoring objective and the spatial scale of representativeness must be determined. Appropriate siting scales for the various monitoring objectives are listed below.

Monitoring Objective	Siting Scales
Highest Concentration	Micro, middle, neighborhood (sometimes urban)
Population	Neighborhood, urban
Source Impact	Micro, middle, neighborhood
Background	Neighborhood, regional

The goal in siting stations is to match correctly the spatial scale represented by the sample of monitored air with the spatial scale most appropriate for each station's monitoring objective. The use of this physical basis for locating stations allows for an objective approach, ensures compatibility among stations and provides a physical basis for the interpretation and application of data. The annual review process involves an examination of existing stations to evaluate their monitoring objectives and spatial scale. The results of this review will determine whether sites are deleted, added, or modified. Further details on network design can be found in Appendix D to 40 CFR 58.

1.2 GENERAL MONITORING NEEDS

Montana is a large state (147,138 square miles - fourth largest in the nation) but has a fairly small population (799,065 - 1990 census). Most of the Big Sky Country (a nickname coined for the state) is pristine and altered little by man's hand. This is not to say that the state is not without its air quality problems. There are some places where air quality is a fragile resource.

1.2.1 PARTICULATES

Air pollution caused by particulate matter is the major problem in the state and receives the highest priority from department staff. The major sources of particulates are traffic on paved and unpaved roads, residential wood combustion, industrial activity, coal mines, and agricultural activity. For years, the state was concerned with total suspended particulates (TSP) and planned and sought ways to control sources of this pollutant. As a result of the 1977 amendments to the Clean Air Act, several areas of the state were designated non-attainment of either the primary or secondary standard for TSP. The state wrote State Implementation Plans (SIP) with corrective plans to bring the areas into compliance. Control strategies were implemented but were sometimes inadequate to bring the area into compliance. In other cases, the source mix changed before the area was shown in compliance.

On July 31, 1987, the EPA promulgated new ambient air quality standards for particulate matter. The new standards changed the focus from larger particles (TSP) to smaller inhalable particles known as PM-10 (particles with an aerodynamic diameter less than 10 microns). As a result of this standard, the EPA assigned various parts of Montana to one of three categories. Seven communities were identified as Group I areas (likely to violate the standards), six as Group II areas (may violate the standards) and the rest of the state was considered Group III. Group III areas are not necessarily in compliance since data may not be available for determination. Since this original classification, two of the Group II areas have exceeded the standard. They are called "Group II with exceedances" but are treated as Group I. Due to provisions in the Clean Air Act Amendments of 1990, all Group I areas and Group II areas with exceedances were designated non-attainment. The non-attainment provisions of the Clean Air Act mandate definite schedules to show attainment and provide for sanctions and federal oversight if the dates are not met.

The state has been heavily involved with monitoring and planning activities and is writing SIPs to bring the areas into compliance. It should be noted that Montana has 11% of the nation's PM-10 Group I areas and the SIP development process requires a significant commitment of resources.

1.2.2 SULFUR DIOXIDE

Sulfur dioxide (SO_2) is another pollutant of concern in the state. There are only four areas in the state where SO_2 is an issue or a problem. These are the Billings/Laurel area, East Helena, Colstrip and near Scobey. In all cases the sources for SO_2 are industrial point sources.

In the Billings/Laurel area, the industrial sources of SO_2 include a coal-fired power plant, three oil refineries, a sugar beet processing facility and a sulfur recovery facility. The combined source mix contributes to some fairly high ambient readings. In 1977, the Laurel area was designated non-attainment for SO_2. In December, 1977 a stipulation was signed with the Billings/Laurel industries and the state. This stipulation was incorporated into the SIP and was the tool to bring the area into compliance. Subsequent monitoring networks for SO_2 have shown the area to be in compliance with the national ambient air quality standards (NAAQS) but exceeding the Montana ambient air quality standards (MAAQS).

In 1987, the Montana legislature passed a bill changing the MAAQS to NAAQS for existing sources in the Billings/Laurel area. Following the session, a committee of the Billings/Laurel industries, the local chamber of commerce, and air pollution professionals formed to monitor and report on the area's air quality. The aim of the committee was to arrive at some solutions to the SO_2 problem of the area. Due to interest by the EPA and environmental groups, the state and Billings/Laurel industries conducted peak five-minute monitoring for SO_2 during the winter of 1990-91. During the summer of 1991, a contractor for EPA will review the peak five-minute data and its relationship to the hourly averages (peak-to-mean ratios). Depending on the results of this review and discussions with staff and EPA, the state will determine if additional peak monitoring is needed.

In East Helena, the industrial source of SO_2 is a primary lead smelter. In 1977, the area was designated non-attainment for SO_2. The smelter installed an acid plant and modified stacks to reduce sulfur dioxide emissions. Data from samplers in the immediate vicinity of the smelter have shown exceedances but no violations of the NAAQS or MAAQS. There were some "violations" of the three-hour NAAQS in 1987 at an SO_2 site about four miles from the smelter near a cement manufacturing facility. A data review did not determine any cause for the high readings and it was difficult to determine if the readings were valid. No other violations have occurred since this time.

In April, 1991, EPA notified the department that the East Helena SO_2 SIP was inadequate, needed to be redone and submitted to EPA by May 1992. This request was driven by an inadequate GEP stack height analysis and requirements in the Clean Air Act Amendments of 1990.

In Colstrip, the industrial sources for SO_2 are four coal-fired power plants. Colstrip Units #1 and #2 were permitted in 1973 by the state. Unit #1 was commissioned in October 1975 and Unit #2 in August 1976. The units utilize wet scrubbers for SO_2 control with an efficiency of 70%.

In 1978, EPA issued a permit for Colstrip Units #3 and #4. EPA was the issuing agency because, at this time, the state had not been delegated PSD permitting authority. The issue of impact on the Northern Cheyenne PSD Class I area resulted in higher stacks and greater control efficiencies for Units #3 and #4. These units use wet scrubbers with lime injection resulting in an SO_2 control efficiency of 90%.

The company maintains an ambient network around the facility and supports a tribal air monitoring program on the Northern Cheyenne reservation. Data submitted by the company are very low and show no violations of the NAAQS or MAAQS.

Near Scobey, north of the U.S.-Canadian border, a Canadian coal-fired power plant was built with no controls for SO_2. The nearness to the border prompted state and EPA officials to conduct background and (after the facility was built) source impact studies. The department no longer collects ambient data but Canadian monitoring stations show ambient levels continue to meet MAAQS and NAAQS.

1.2.3 LEAD

Lead is a pollutant of concern in East Helena. The source of lead is predominately from a primary lead smelter. The EPA promulgated ambient air quality standards for lead on October 5, 1978. The East Helena area was determined to be in violation of the lead standard based on monitoring data. The department conducted extensive studies to determine the proper source apportionment in the early 1980s. A SIP was developed and approved by EPA in 1984 which contained control strategies expected to bring the area into compliance.

As of December 31, 1986, all the control strategies in the plan were implemented. Unfortunately, ambient air monitoring data for 1987 and 1988 indicated that lead levels decreased but remained above the lead standard. As a result, EPA notified Montana on October 1, 1988, that the East Helena lead SIP was inadequate.

During the last half of 1990 and the first half of 1991, the state and the companies involved conducted ambient monitoring, emission inventory estimations, source apportionment studies, meteorological data collection, and dispersion modeling in support of a new SIP. The date for submittal of a new SIP document to EPA is scheduled for February, 1992.

1.2.4 CARBON MONOXIDE

Carbon monoxide (CO) is a pollutant of concern in the larger communities in Montana. Currently, there are three CO non-attainment areas in Montana; these are Missoula, Great Falls and Billings. Automobile exhaust is the principal source of CO emissions in these communities. Other sources include industrial emissions as well as agricultural and forestry burning. In western Montana, including Missoula, residential wood combustion is a contributing source to ambient CO levels.

The department, in cooperation with the various county air pollution agencies, monitors for CO in Missoula, Great Falls and Billings. Most high concentrations occur in wintertime months due to stagnant weather conditions, cold temperatures, and poor fuel combustion from the various sources.

In 1989, the department conducted and submitted CO emission inventories in the three non-attainment areas to EPA. The department is awaiting comments from EPA on the adequacy of these emission inventories. New emission inventories using 1990 as a base year are due to be completed by November 1992. Additional controls for CO in Missoula will be gained by implementing an oxygenated fuels program.

Due to provisions in the Clean Air Act Amendments of 1990, Missoula was categorized as a "moderate" non-attainment area. This label was given because the design value was greater than 9.5 ppm for an eight hour period. The state is required to submit a full SIP to EPA for Missoula. Billings and Great Falls were categorized as "interim" or "transitional" under the CAAA. This label was given because the design values for these communities were less than 9 ppm. The state is required to submit community-specific maintenance plans to EPA.

1.2.5 OZONE

Ozone (O_3) is not a pollutant of concern in Montana. All areas of the state are considered attainment for ozone. Unlike most other pollutants, O_3 is not emitted directly into the atmosphere but results from a complex photochemical reaction between volatile organic compounds (VOC), oxides of nitrogen (NOx), and solar radiation. Both VOC and NOx are emitted

directly into the atmosphere from sources within the state. Since solar radiation is a major factor in O_3 production, O_3 concentrations are expected to peak in the summer months.

The department conducted O_3 monitoring in Billings in 1988 and 1989. Billings is in an area where sources emit fairly large quantities of VOC and NOx. Billings also has hot summer days which may promote photochemical reactions. The data collected showed higher concentrations in the summer months but were all within the NAAQS.

1.2.6 NITROGEN DIOXIDE

Nitrogen dioxide (NO_2) is not a pollutant of concern in Montana. NO_2 is formed when nitric oxide (NO) is oxidized in ambient air. Oxides of nitrogen (NOx) is a term used to represent both NO_2 and NO. Emission inventories for point and area sources are usually expressed as NOx whereas the standard is for NO_2.

Point sources of NO or NO_2 in the state include coal-fired power plants, natural gas compressor stations, and other miscellaneous industries such as oil refineries and a kraft paper pulp mill. Mobile sources include tailpipe emissions from automobiles.

The department itself has done no monitoring for NO_2 in the last five years. However, there has been some company monitoring for NO_2 in Colstrip and Missoula. These monitoring activities were required as conditions of PSD permits. Data submitted by the companies have shown no violations of the NAAQS or MAAQS.

1.3 MONITORING OBJECTIVES

The department has developed and maintained an air monitoring network covering problem areas in the state over the years that the department has had an air quality program. In the mid to late 1960s the department used high volume samplers (hi-vols), dustfall jars, "Montana Boxes" (for fluoride), and sulfation plates to assess ambient air quality impacts from various sources. Initial program development selected monitoring locations based on field investigations, complaints, surveys, public interest and professional judgement of the staff.

In the early to mid-1970s, other monitoring devices came on the scene. These included gas bubblers for SO_2 and NO_2, hi-vols with metal shelters (early versions were made of wood), and continuous analyzers particularly for SO_2. During these years, metal analysis was begun on hi-vol filters collected near smelting and mining activities.

From mid to late 1970s, the monitoring effort was refined as state-of-the-art equipment was becoming available and being deployed in the field. The state became involved in several special-purpose air pollution studies. The department was involved with the Montana Air Pollution Study (MAPS) which conducted extensive ambient air monitoring in Anaconda, Butte, Billings and Missoula. The purpose of the study was to relate air pollution concentrations with measured human health effects within and between the different communities. The department published several documents detailing the results of these studies.

At about the same time, the department was also involved with investigative and background studies for the Flathead River Basin EIS (Kalispell, Columbia Falls, Polson, etc.), Poplar River project (by Scobey in northeast Montana), and energy development in eastern Montana (particularly in the Colstrip area).

As a result of the 1977 Amendments to the Clean Air Act, several areas in Montana were designated non-attainment for various NAAQS based on air quality data. Air quality monitoring increased in these areas as SIPs were being developed. Field sampling, emission inventory estimates and dispersion modeling allowed staff to focus on worst-case or maximum concentration sites. This applied mostly to CO and TSP non-attainment areas.

In 1978, the EPA promulgated a standard for lead (previously discussed). Emphasis on lead monitoring and investigations to determine maximum concentration sites were conducted in the East Helena area as part of the original SIP. The present day network evolved from this study.

In 1981-82, an SO_2 surveillance network was established as a condition of the 1977 Stipulation with the Billings/Laurel industries and the state. The network, at that time, contained eight SO_2 monitoring sites equipped with meteorological sensors and one upper air station. Industrial locations, topography, wind roses, emission estimates and past ambient data were used to situate the sites in maximum concentration locations or where the public may be affected.

In East Helena and Colstrip, monitoring networks were set up which essentially encircled the point sources. These multiple site networks allow adequate coverage (regardless of the wind direction) to determine maximum concentrations from the sources.

Quality control and assurance were always considered and performed as part of the collection of the data. The state's application of quality assurance, monitoring methodology, probe siting and network design was good but not necessarily consistent with others in the nation.

At the request of the Deputy Administrator of the EPA, the Standing Air Monitoring Work Group (SAMWG) was formed in 1975. This group was made up of people representing state and local air pollution control agencies, EPA Headquarters and EPA regional offices. The purpose of the group was to critically review and evaluate current air monitoring activities, develop more effective air monitoring strategies, help correct identified problems, improve overall current operations and meet projected air monitoring goals.

Attempting to correct some air monitoring deficiencies, SAMWG developed a number of recommendations. These were promulgated in the Federal Register on May 10, 1979 and later updated on March 19, 1986 and July 1, 1987 (40 CFR Part 58).

The areas covered included:

Appendix A - Quality Assurance Requirements for State and Local Air Monitoring Stations.

Appendix B - Quality Assurance Requirements for Prevention of Significant Deterioration (PSD) Air Monitoring.

Appendix C - Ambient Air Quality Monitoring Methodology.

Appendix D - Network Design for State and Local Air Monitoring Stations and National Air Monitoring Stations.

Appendix E - Probe Siting Criteria for Ambient Air Quality Monitoring.

Appendix F - State and Local Air Monitoring Stations Air Quality Annual Report.

Appendix G - Uniform Air Quality Index and Daily Reporting.

Appendices D and E include network review, design and siting criteria. In the state's first network review (1979 Network Review), the department designated each monitoring site in the state as either a National Air Monitoring Station (NAMS), State and Local Air Monitoring Station (SLAMS), or Special Purpose Monitoring station (SPM). The NAMS/SLAMS network was developed to meet the four basic monitoring objectives as listed in Section 1.1 above. Some stations are established which have more than one monitoring objective. For instance, a station may be in an area where the highest concentration would be expected to occur but would also be representative of a population area.

Table 1 at the end of this report gives a brief description of the state-wide ambient air monitoring network. The table lists all sites operated by the department, county agencies and some operated by industrial concerns. The table provides a narrative regarding any changes or modifications to the sites. It also lists any proposed sites. Table 2 provides a short list of all sites listed in Table 1 without the narrative.

2.0 AMBIENT MONITORING NETWORK COVERAGE

This section addresses air quality problems and concerns in Montana. It is a continuation of discussions presented in Section 1.2 regarding specific pollutants and problem areas. Each of the EPA criteria pollutants is discussed regarding what data has been collected and the results. This section also contains the approach used by the department to select and maintain site locations (continuation of Section 1.3) and the current air monitoring coverage. Each pollutant is discussed individually within specific sections for each Air Quality Control Region (AQCR) and county.

The review analyzes emissions, ambient, meteorological and other data related to specific sites or problem areas. The review is intended to show that existing monitoring sites should continue to operate because they still serve a purpose or are not needed and should be terminated. There are some instances where some sites may need to be modified in order to meet an intended purpose.

The 1991 Network Review contains a section dealing with meteorological data collection. The department uses various weather instruments to measure parameters such as wind speed, wind direction, temperature and so forth. These values are used in support of the analysis of air pollution data and to estimate pollutant concentration through dispersion models.

2.1 SULFUR DIOXIDE AREAS

As mentioned in Section 1.2.2, there are only four areas in the state where SO_2 is an issue or concern. These are the Billings/Laurel area in Yellowstone County, East Helena in Lewis & Clark County, Colstrip in Rosebud County and by Scobey in Daniels County.

2.1.1 AQCR 140 - SOUTH CENTRAL MONTANA

2.1.1.1 YELLOWSTONE COUNTY

The sulfur dioxide issue in Yellowstone County has been with the air quality program since its inception in the mid to late 1960s. Early monitoring with sulfation plates and SO_2 analyzers showed that the Laurel area exceeded air quality standards and the Billings area measured elevated levels.

There are six major sources in the Billings/Laurel area which emit SO_2. In Billings, these include Exxon (oil refinery), Conoco (oil refinery), Montana Power (coal-fired electric power generating facility), Western Sugar (sugar beet factory), and Montana Sulphur & Chemical (sulfur recovery facility). In

Laurel, the major source is the Cenex oil refinery. Emissions of SO_2 for these sources for 1987 were estimated to be around 32,000 tons/year.

Billings and Laurel are situated along the Yellowstone River valley in south central Montana. The Yellowstone River valley runs from southwest to northeast and is a predominant topographical influence on the airflow in the area. In Billings, there are cliffs or rimrocks located both north and south of the river which also tend to cause channeling. The distance between the north and south rims range from about one to five miles. In Laurel, the valley tends to be a little wider and the predominant high terrain is not close by. The cities of Billings and Laurel and all of the industrial sources are located along the river valley. Nearby terrain is often higher than the highest smoke stacks.

Wind roses in the area are reflective of the valley orientation. The predominant wind direction is from the SW with NE being the second most predominant direction. As with many areas in Montana, the area experiences inversions in the fall and winter months. This causes pollutants to become trapped and build up for extended periods. Inversion breakup occurring after sunrise causes built-up concentrations to lower to the ground and results in elevated readings measured at the monitoring stations. With frontal passage or higher wind speeds, winds can cause plumes to directly impact the ground resulting in high SO_2 concentrations.

In 1977, a stipulation was signed between the department and the Billings/Laurel industries. The stipulation (requiring the industries to employ various control options) was the framework used to bring the area into compliance with ambient standards. In 1978, the Laurel area was designated non-attainment of the NAAQS for SO_2. The stipulation became part of the SIP and was approved by EPA. The 1977 stipulation also commissioned the department (with industrial funding) to conduct an ambient air quality study to more fully describe the magnitude and geographical extent of the SO_2 concentrations. Another major goal of the study was to identify the relative source contributions from each industry.

In 1981-82, the department (through a cooperative effort with the industries) designed and installed a sulfur dioxide monitoring network. The network consisted of eight SO_2 monitoring sites with meteorological monitors and an upper air site employing acoustic radar and pilot balloons. Six of the SO_2 sites were in Billings and two were in Laurel. Using this data, the department attempted to validate a mathematical model that could predict concentrations from the various SO_2 sources. These attempts failed due to the following reasons: (1) a lack of good emissions data; (2) high concentrations caused by inversion

breakup and direct plume impact (which the model could not handle); (3) over-prediction of plume rise by the model; and (4) receptors being so close to the sources that small changes in wind direction could cause large differences in predicted versus actual concentrations. A novel approach was developed using directional analysis and mass emissions to characterize source contributions to the annual average at the worst-case receptor. This was useful but could not be applied as a predictive tool for short-term averages or at other receptors in the valley.

Following the 1981-82 study, the SO_2 monitoring network was scaled down in various stages until it reached a minimum early in 1987. As mentioned previously, eight SO_2 monitoring stations were in operation in 1982 during the SO_2 study. Following the conclusion of that study, the network was scaled down to four sites in 1983. These included Coburn Road (30-111-0066), Lockwood Park (30-111-0065), North Johnson Lane (30-111-0064) and Taft School (30-111-0064). (It should be noted that no sites were kept in the Laurel area since the two sites in the 1981-82 study showed compliance with the NAAQS and MAAQS. The department felt that greater emphasis was needed in the Billings/Lockwood area.) In December 1983, the Taft School site was shut down to reduce the operator's workload in Billings. The network of three continued until June 1986 when a leasing problem caused the department to shut down the North Johnson Lane site. In January 1987, the department shut down its Lockwood Park site due to further cutbacks of personnel in the Billings office. At that time the network was reduced to a single site (Coburn Road) which has been the backbone of the network.

During 1984 to 1986, the department explored rule-making options to bring the area into compliance with the SO_2 MAAQS. With no easy administrative solutions in sight and political options being more viable, the Montana Legislature passed HB 534 in the 1987 session. This bill exempted the existing Billings/Laurel industries from meeting the MAAQS; they had only to meet the NAAQS (which was being met in Yellowstone County). Acknowledging the state's diminishing role in SO_2 monitoring in Billings, the legislature passed HB 878 which provided state funding for continued monitoring. With this funding the state was able to add one additional site [Scottish Rites (30-111-0073)] to its network.

At the same time, the six Billings/Laurel industries combined resources to address SO_2 issues including monitoring. The Billings/Laurel Air Quality Technical Committee (BLAQTC) was formed in the spring of 1987. BLAQTC hired a contractor, purchased equipment and installed three SO_2 monitoring stations. Two of the sites were in Billings [Lockwood Park (30-111-1065) and Coulson Road (30-111-2004)] and one was in Laurel [Laurel-BLAQTC (30-111-2004)]. The department is a non-paying member of BLAQTC and cooperatively works with the group with site

selection, quality assurance, etc. By the end of 1987 the combined state and BLAQTC network consisted of five sites.

This monitoring network remained the same until October 1989. Upon agreement with the department and BLAQTC, the Scottish Rite site was moved to Ponderosa School (30-111-0076) and the Coulson Road site was moved to Brickyard Lane (30-111-2005). The group felt that the old sites had served their purpose and that higher readings could possibly be monitored at the new sites. The department documented the recent SO_2 monitoring sites in forms sent to EPA on 1-5-90. EPA approved all sites in a letter dated 5-14-90.

In November 1988, the department started collecting peak five-minute SO_2 averages for each hour. Most health effects literature indicates that 5 to 10 minute peaks in the range of 0.4 to 0.75 ppm may cause breathing difficulties for sensitive individuals. The EPA and certain environmental groups have become very interested in this information and have keyed it to certain emergency curtailment actions. The EPA met with the department and BLAQTC in February 1990 and offered two SO_2 analyzers to conduct peak monitoring in the range from 1 to 5 ppm. In September 1990, the department and BLAQTC installed one of these monitors at the Coburn Road site and the other at the Lockwood Park site. These monitors collected peak five-minute data for six months until the end of March, 1991. Peak data was also collected at the other three sites with analyzers in the range of 0 to 1 ppm. Upon completion of the study, EPA will hire a contractor to review and analyze the data.

The department feels the current network is adequate and several of the sites could be considered "maximum concentration sites" depending on wind and weather conditions. There are no plans to change the network in the near future.

2.1.2 AQCR 142 - SOUTHWESTERN MONTANA

2.1.2.1 LEWIS & CLARK COUNTY

The sulfur dioxide issue in Lewis & Clark County (and Jefferson County) has been dealt with for a number of years. Asarco's primary lead smelter is the only major point source for SO_2 in the East Helena area. Monitoring by Asarco in the early 1970s revealed exceedances of the SO_2 standard in the East Helena area. At that time Asarco operated six monitoring sites in the East Helena area.

In 1975, the Montana SIP was revised setting forth SO_2 controls that provided for the attainment and maintenance of the NAAQS. The strategy limited the emission rate for the sinter plant and called for a 75% reduction of SO_2 on an annual basis.

As a result, Asarco installed a double contact acid plant with several modified stacks to reduce the SO_2 emissions in 1977.

Continued monitoring by Asarco showed attainment of the SO_2 NAAQS at all sites except the Kennedy Park site (north of East Helena). In 1977, the area was designated non-attainment for SO_2. It was determined that emissions from shorter stacks serving the smelter's blast furnace were the cause of the exceedances. In 1978 and again in 1980, field tracer studies were conducted to determine good engineering practice (GEP) stack height for a proposed taller stack. These proposed changes were submitted as part of the SIP. In 1982, a new blast furnace baghouse stack was built. The taller stack allowed emissions to be dispersed at a higher elevation and eliminated high concentrations near ground level.

From 1974-1982, the department operated three SO_2 sites adjacent to Asarco's sites. After the acid plant was installed and the new blast furnace baghouse stack was built, ambient concentrations dropped dramatically and the state discontinued their sites, relying on Asarco to provide SO_2 concentration data. Asarco currently operates six SO_2 monitoring stations in the East Helena area. They are as follows: Kennedy Park (30-049-0703), East Station (30-049-0711), Kleffner Road (30-049-0701), Water Tank (30-049-0702), Microwave Tower (30-043-0903), and Ash Grove Siding (30-043-0908).

Data from samplers in the immediate vicinity of the smelter have shown exceedances but no violations of the NAAQS or MAAQS. There were some "violations" of the three-hour NAAQS in 1987 at an SO_2 site about four miles from the smelter near a cement manufacturing facility. This was at the Highway 518 site (30-043-0906). A data review did not determine any cause for the high readings and it was difficult to determine if the readings were valid. No other violations have occurred since this time.

In 1987, the Asarco primary lead smelter emitted approximately 29,000 tons/year of SO_2. The Asarco smelter is located next to the city of East Helena in the Helena valley. The Helena valley is a fairly wide valley (approximately 16 miles by 16 miles) and lies east of the Continental Divide. The valley is surrounded by mountains and, as with many areas in Montana, experiences inversions in the fall and winter months. East Helena is located at the southern end of the valley. Nighttime drainage winds from the south along the Prickly Pear Creek often cause emissions to drift to the north. This was the probable cause of high concentrations at the Kennedy Park monitor. Located east of the Continental Divide, the valley often sees down-slope winds which ventilate the valley fairly well. Predominant wind directions are from the northwest through southwest.

In April, 1991, EPA notified the department that the East Helena SO_2 SIP was inadequate, needed to be redone and submitted to EPA by May 1992. This request was driven by an inadequate GEP stack height analysis and requirements in the Clean Air Act Amendments of 1990. In 1991, the department received Asarco's SO_2 data from 1986 through 1989 on magnetic media and updated it to AIRS. The data falls short of proper QA procedures such as weekly zero/span checks and quarterly audits. As a result, the department is working with Asarco to obtain the precision and accuracy data that corresponds with the ambient data. The current network is adequately distributed to show attainment and maintenance of the NAAQS and MAAQS.

The department is currently working out details for a new SIP for East Helena SO_2 with Asarco. A tentative schedule has been drafted with specific details to follow.

2.1.3 AQCR 143 - EASTERN MONTANA

2.1.3.1 DANIELS COUNTY

The sulfur dioxide issue in Daniels County centered around two coal-fired power generating plants located north of the U.S.-Canadian border near Coronach, Saskatchewan. In 1976, the department initiated SO_2 background monitoring at two sites near Scobey as part of the Poplar River Basin Environmental Impact Study. The sites were temporarily shut down from June, 1983 to July, 1984 and again from June, 1985 to July, 1986. From September, 1986 until July, 1987 the department operated one site at the Marlenee ranch.

In 1984, the coal-fired power plants began production. Data since that time has shown little impact from these sources. The topography of the land north of Scobey is flat to rolling and is used for grain production. The flat terrain lends itself to being a well ventilated area. Although the power plants have little to no control for SO_2, the pollutants are so well dispersed that concentrations on the Montana side of the border are low. The power company and Saskatchewan Environment operate two monitoring sites near the facility. This information is shared with the state through a bilateral monitoring agreement. Ambient concentrations from these sites are well within the NAAQS and MAAQS.

The department has discontinued SO_2 monitoring in the area. For several years the department operated a sulfation plate network around Scobey. These indicators measure sulfur compounds in the area. Due to the low readings the department discontinued sulfation plates at the end of 1990.

2.1.3.2 ROSEBUD COUNTY

The sulfur dioxide issue in Rosebud County centers around the Montana Power Company's four coal-fired power generating plants in Colstrip. Units #1 and #2 were permitted in 1973 by the state. Unit #1 was commissioned in October 1975 and Unit #2 in August 1976. The SO_2 control for these units are wet scrubbers with a 70% control efficiency.

In 1978, a PSD permit was issued by the EPA for Colstrip Units #3 and #4. EPA was the issuing agency because, at this time, the state had not been delegated PSD permitting authority. The state issued a construction and operating permit. The issue of impact on the Northern Cheyenne PSD Class I area resulted in higher stacks and greater control efficiencies for Units #3 and #4. The control for these units is wet scrubbers with lime injection and results in a 90% control efficiency.

The company maintains an ambient network around the facility and supports a tribal air monitoring program on the Northern Cheyenne reservation. Data submitted by the company show very low concentrations with no violations of the NAAQS or MAAQS.

The topography of the area is semi-rugged to rolling terrain. The area sometimes experiences temperature inversions but generally receives good airflow and is usually well ventilated.

The Colstrip area is considered attainment for SO_2. The department is currently processing Montana Power's SO_2 data and updating it to AIRS. The department is also obtaining precision and accuracy data. It is still imperative to keep collecting ambient SO_2 data with the current network. The current network is adequately distributed to show attainment of the NAAQS and MAAQS and PSD increments.

2.2 NITROGEN DIOXIDE AREAS

As mentioned in Section 1.2.6, nitrogen dioxide is not a pollutant of concern in Montana. There are, however, two areas in the state where NO_2 is being monitored by companies as a permit condition. These areas are in Missoula and Colstrip.

2.2.1 AQCR 143 - EASTERN MONTANA

2.2.1.1 ROSEBUD COUNTY

The nitrogen dioxide issue in Rosebud County centers around Montana Power Company's four coal-fired power generating plants in Colstrip. Units #1 and #2 were permitted in 1973 by the

state. Unit #1 was commissioned in October 1975 and Unit #2 in August 1976. In 1978, a permit was issued by the EPA for Colstrip Units #3 and #4. EPA was the issuing agency because, at this time, the state had not been delegated PSD permitting authority. The state issued a construction and operating permit.

The company maintains an ambient network for NO_2 around the facility and supports a tribal air monitoring program on the Northern Cheyenne reservation. Data submitted by the company are very low and show no violations of the NAAQS or MAAQS.

The topography of the area is semi-rugged to rolling terrain. The area sometimes experiences temperature inversions but generally receives good airflow and is usually well ventilated.

The Colstrip area is considered attainment for NO_2. The department has updated all of Montana Power's NO_2 data through the end of 1989 and will continue to update it to the present. The department is also obtaining precision and accuracy data. It is still imperative to keep collecting ambient NO_2 data with the current network. The current network is adequately distributed to show attainment of the NAAQS and MAAQS.

2.2.2 AQCR 144 - NORTHWESTERN MONTANA

2.2.2.1 MISSOULA COUNTY

The nitrogen dioxide issue in Missoula County centers around the Stone Container kraft paper pulp mill near Frenchtown. In May 1987, the company received a PSD permit from the state to burn petroleum coke in their four lime kilns. As a permit condition, Stone Container was required to operate one NO_2 monitoring site near their facility. To date, only one lime kiln has been converted to burn coke. The data collected and submitted to the state by Stone show very low concentrations with no violations of the NAAQS or MAAQS.

Missoula is situated at the confluence of the Bitterroot and Clark Fork Rivers. The Missoula valley is fairly narrow but is the home to nearly 65,000 persons. The Missoula valley is similar to other western Montana valleys in that it is susceptible to temperature inversions in the fall and winter months. Wind speeds are generally calm (less than 10 mph) throughout the year.

The NO_2 monitoring site is still needed until a time that all four lime kilns are converted to burn coke and the ambient data shows that the area remains in compliance with the NAAQS and MAAQS.

2.3 CARBON MONOXIDE AREAS

Carbon monoxide (CO) is a pollutant of concern in the larger communities in Montana. Currently, there are three CO non-attainment areas in Montana; they are Missoula, Great Falls and Billings. Automobile exhaust is the principal source of CO emissions in these communities. Other sources include industrial emissions as well as agricultural and forestry burning. In some western Montana valleys, residential wood combustion is a major contributing source.

As part of the network review process, the department looked at other communities where CO may be a problem. These are discussed in the following sections.

2.3.1 AQCR 140 - SOUTH CENTRAL MONTANA

2.3.1.1 YELLOWSTONE COUNTY

In Yellowstone County, the Billings downtown area was designated non-attainment for CO due to high readings at the 27th & Montana monitoring site (30-111-0053). Automobile exhaust was thought to be the principal source of CO. As part of the SIP development process, a model predicted that an area along Main Street (formerly Exposition Drive) had the highest potential to exceed the standards. The plan for the attainment of the 8-hour standard predicted that modification to the Main Street-First Avenue North intersection would achieve the standard.

Data collected at the Metra Parking Lot site (30-111-0061) during the two years following the modifications to Main Street (1985-86) indicated compliance with the standard. Upon EPA's review of the redesignation request, the department was informed that (1) the data collected did not meet the completeness requirement, (2) the site should be relocated nearer the road at a maximum concentration microscale site, and (3) a redesignation request would have to show attainment/maintenance at all locations.

Attempts to locate a new EPA-approved site followed a somewhat convoluted path. EPA wanted a site just north of the 4th Avenue entrance to the Metra Parking Lot. Permission could not be obtained mostly due to traffic and safety concerns. A site was temporarily located near the Main Street-6th Avenue North intersection (30-111-0074), but soon after it started operation, water pipes and valves were unearthed below the monitoring shelter. It was decided that this site was impractical considering future access to the same water valves.

After a lengthy approval process, EPA granted permission to locate a microscale CO monitor just south of the 4th Avenue North entrance to the Metra Parking Lot (30-111-0075). CO data at this site has been collected since October 1988 and has shown no exceedances of the MAAQS or NAAQS.

In order to show attainment and maintenance of the standard at all locations, Yellowstone County Air Pollution Control conducted CO grab sampling studies during the winter of 1988-89 and the winter of 1989-90. Both studies showed that the current site is probably in the worst-case area but there may be other areas of concern along 24th Street West and Central Avenue. This area is along a strip development/shopping centers area west of downtown.

The city of Billings is situated along the Yellowstone River valley. The Yellowstone River valley runs from southwest to northeast and is a predominant topographical influence on the airflow in the area. Located both to the north and south of the river are cliffs or rimrocks which tend to cause channeling. The distance between rims is about one mile wide where the current monitoring site is located. In addition to the CO from mobile sources next to the sampler, general drainage winds bring CO past the monitoring station from the greater downtown area.

Since the area is currently non-attainment for CO and an attainment demonstration still needs to be made, the monitor will be kept at its current location. To address attainment/maintenance of CO at other areas of concern in Billings, the department and YCAPC intend to perform another CO saturation study during November 1991 and January 1992. This study will be used to ascertain maximum concentration sites and will be used as a tool to site a second continuous CO monitor in the Billings non-attainment area if it is deemed necessary. The probability of another site is dependent upon resources, equipment availability and the results of the saturation study.

Due to provisions in the Clean Air Act Amendments of 1990, Billings was categorized as "interim" or "transitional" under the CAAA. This label was given because the design value for this community was less than 9 ppm. The state is required to submit community-specific maintenance plans to EPA.

2.3.2 AQCR 141 - CENTRAL MONTANA

2.3.2.1 CASCADE COUNTY

In Great Falls, a corridor along 10th Avenue South was designated non-attainment for CO in September, 1980 due to high readings at the Midas Muffler site (10th Ave. South and 9th Street)(30-013-0015). This particular site ran from 1977 until

1979 when a leasing problem forced the state to relocate the monitor about twelve blocks east at the Great Falls Federal site (30-013-0021). This site operated until 1983 when the monitoring trailer was again moved to the Pardis Clinic (30-013-1023) site. The Pardis site was located one block west and across the street from the original Midas Muffler site. The department anticipated higher concentrations at this site because it was located at a lower elevation and the traffic volume on 10th Avenue South was higher.

Sampling at the Pardis Clinic site began in November, 1983 and was established as a middle scale site. In May, 1987 and again in August, 1987, EPA informed the state that "in order to determine whether an area is attaining the NAAQS, a control agency must locate at least one monitoring station in the area of maximum concentration." EPA interprets such a location for CO to be a microscale site. On November 4, 1987, the department moved the probe to be within microscale siting. The site remained microscale until November 16, 1988 when the site was moved back to middle scale at the landowner's request.

Since microscale siting at the Pardis Clinic could not be continued, the department located the CO trailer about a block west on 10th Avenue South at the Skyway Conoco site (30-013-1025) on November 9, 1989. This site modification request was submitted to EPA for their approval. This site is currently in operation and is microscale.

Automobile exhaust was originally thought to be the principal source of CO. As part of the SIP development process, a model predicted that several intersections along 10th Avenue South could have the potential for violating the NAAQS for CO. In the plan submitted to EPA, CO standards could probably be achieved by 1985 or 1986 with EPA-mandated emission standards for automobiles, increased traffic speed along 10th Ave. South, improved traffic light synchronization, a widening of a bridge, a mass transit system and reductions at the Montana Refining Company.

CO data collected at the Pardis Clinic site showed a few exceedances of the 8-hour standard from 1986-88. A review of the exceedances showed that most occurred in the evening hours with very light to calm winds. A staff review of data performed in 1983 showed that area-wide sources could be contributing to the elevated readings.

Due to the continued noncompliance at the monitoring sites on 10th Avenue South, EPA has told the state that the SIP is inadequate and will need to be redone. As part of this rewrite,

CO emission inventory data was submitted to EPA in December, 1989. The department is currently waiting for comments from EPA on the adequacy of this emission inventory. A new emission inventory using 1990 as a base year is due by November 1992.

Due to provisions in the Clean Air Act Amendments of 1990, Great Falls was categorized as "interim" or "transitional" under the CAAA. This label was given because the design value for this community was less than 9 ppm. The state is required to submit community-specific maintenance plans to EPA. EPA mandated tailpipe controls are expected to bring attainment by 1995. A 3% decrease in population since 1980 should assist in the attainment.

The department will continue to monitor for CO at the Skyway Conoco site. At this time there is no plan to modify the site or to establish a second site in Great Falls.

2.3.3 AQCR 142 - SOUTHWESTERN MONTANA

2.3.3.1 SILVER BOW COUNTY

Butte, located in Silver Bow County, was suggested by staff as a possible location for a carbon monoxide monitoring site. The area is currently attainment or unclassified for CO. In 1987-88 an SPM site for CO was operated on Continental Drive (30-093-0022) near the main entrance to the Berkeley Pit and within a few blocks of the department's PM-10 site at Greeley School (30-093-0005). The highest 8-hour reading was 9.1 ppm. In 1978-79, the department operated a site at Hebgen Park (30-093-0018). The highest 8-hour concentration was 7.8 ppm. Neither site would be considered a maximum concentration site for CO.

Butte has a population of approximately 34,000 persons. The elevation averages 5300 feet with the Continental Divide surrounding the city on three sides. Wind speeds in Butte are usually calm and the area is susceptible to severe temperature inversions in the fall and winter. The old part of Butte is built on a hillside next to the Berkeley Pit. The new part of town is built on the "flats" to the south and is where much of the strip development is located. Harrison Avenue is a street that links uptown with the flats. Interstate 90 is a major east/west highway that slices through the lower part of town with off-ramps to Harrison Avenue.

The department proposes establishing a CO site near the Harrison Avenue-Interstate 90 intersection. Exact siting would involve an on-site inspection of the area, review of traffic counts and collecting CO grab samples. Appropriate network

modification forms will be filled out and submitted to the EPA for approval. The establishment of this site depends upon resources, equipment availability and the results of the CO saturation study.

2.3.4 AQCR 144 - NORTHWESTERN MONTANA

2.3.4.1 FLATHEAD COUNTY

Kalispell, in Flathead County, was suggested by staff as a possible location for a carbon monoxide monitoring site. The area is currently attainment or unclassified for CO. There has been no previous CO monitoring in Kalispell.

Kalispell has a population of approximately 12,000 persons although there are many others living in outlying areas and in smaller communities nearby. Kalispell serves as a business, service and shopping center for the greater Flathead valley. The Flathead valley is fairly wide (14 miles across) but is west of the Continental Divide. The climate is mild with calm or low wind speeds. Like many communities in the western part of the state, the area is susceptible to temperature inversions in the fall and winter. Two major highways serve Kalispell. These are Highway 2 which is an east/west link and Highway 93 which is a north/south link. These two highways meet at a stoplight in Kalispell at Main Street (Highway 93) and Idaho Avenue (Highway 2). The queuing time for this intersection can be quite lengthy, allowing motor vehicles to idle for extended periods, emitting large quantities of CO.

Residential wood combustion in Kalispell is quite prevalent as much of the community has fairly easy access to wood from local forests. The CO emitted by traffic at the Main Street-Idaho Avenue intersection combined with the area-wide contribution from wood stoves has the potential to create elevated concentrations of CO.

The department proposes to establish a CO site near the Main Street-Idaho Avenue intersection. Exact siting would involve an on-site inspection of the area, review of traffic counts and collecting CO grab samples. Appropriate network modification forms will be filled out and submitted to the EPA for approval. The establishment of this site depends upon resources, equipment availability and the results of the CO saturation study.

2.3.4.2 MISSOULA COUNTY

The entire city of Missoula was designated non-attainment for CO based on high concentrations recorded at the intersection of Brooks (U.S. 93), Russell and South. This intersection and the monitoring site are known as Malfunction Junction (30-063-0005). Exceedances of the 8-hour CO standard have also been observed at other air monitoring sites in Missoula: Lions Park (30-063-0019), Higgins Avenue (downtown area) (30-063-0023) and Boyd Park (30-063-0024).

A SIP was submitted to EPA which detailed a plan to bring the area into compliance. The plan called for the reconstruction of the Malfunction Junction intersection including limited turn lanes, timing sequences for the traffic lights and increased vehicle speeds. Additional reconstruction was performed on a portion of Highway 93 between Mount Avenue and Reserve Street. The reconstruction was completed in late 1985.

The Malfunction Junction site was temporarily shut down in July 1983 and reactivated in January, 1986 after the completion of the reconstruction. The CO data collected since 1986 still shows some exceedances of the 8-hour CO standard.

A second CO site in Missoula has operated at Boyd Park in the southern part of the city since 1981. It is suspected that most emissions at this site are from residential wood combustion although CO from traffic may also be a contributing factor. In May 1991, the department made a request to EPA to permanently shut down the site. The site had not measured an 8-hour CO exceedance since 1987 and the site was in the same general area as the maximum concentration site of Malfunction Junction.

EPA responded to the department's request in a letter dated August 8, 1991. They disapproved of the proposal to permanently shut down the Boyd Park CO site. They needed additional justification (documentation) that Malfunction Junction is the maximum CO location and that there is no need for a second CO monitoring site in Missoula (i.e., that Malfunction Junction can adequately address all contributing sources to the CO problem in Missoula, whether they are mobile, point or area sources).

Missoula is situated at the confluence of the Bitterroot and Clark Fork Rivers in western Montana. The city has a population of approximately 45,000 persons but the urban area contains approximately 65,000. The Missoula valley is fairly narrow (approximately 6 miles across) and similar to other western Montana valleys in that it is very susceptible to temperature inversions in the fall and winter months. Wind speeds are calm or low throughout the year and allow concentrations to build up.

EPA and the department are concerned that area-wide sources such as residential wood combustion combined with traffic emissions contribute to elevated CO levels at other areas in Missoula. In July, 1988, EPA notified the department that the Missoula CO SIP was substantially inadequate. The department and Missoula County prepared a new emission inventory and submitted it to EPA in December 1989. The department is currently waiting for comments from EPA on the adequacy of this emission inventory. A new emission inventory using 1990 as a base year is due by November 1992. Additional controls for CO in Missoula will be gained by implementing an oxygenated fuels program. This program is due to be in place by November 1, 1992.

Due to provisions in the Clean Air Act Amendments of 1990, Missoula was categorized as a "moderate" non-attainment area. This label was given because the design value was greater than 9.5 ppm for an eight hour period. The state is required to submit a full SIP to EPA for Missoula.

2.4 OZONE AREAS

Ozone (O_3) is not a pollutant of concern in Montana. All areas of the state are considered attainment for ozone. Unlike most other pollutants, O_3 is not emitted directly into the atmosphere but results from a complex photochemical reaction between volatile organic compounds (VOC), oxides of nitrogen (NOx), and solar radiation. Both VOC and NOx are emitted directly into the atmosphere from sources within the state. Since solar radiation is a major factor in O_3 production, O_3 concentrations peak in the summer months.

2.4.1 AQCR 140 - SOUTH CENTRAL MONTANA

2.4.1.1 YELLOWSTONE COUNTY

The department conducted O_3 monitoring in Billings in 1988 and 1989 at the Scottish Rites monitoring site (30-111-0073) in the city center. Billings is in an area where sources emit fairly large quantities of VOC and NOx. Billings is also an area where hot summer days may promote photochemical reactions. EPA defines the O_3 monitoring season for Montana as June 1 to September 30. Ozone data collected at the Scottish Rites site showed higher concentrations in the summer months but were all within the NAAQS.

The Scottish Rites site (which also monitored for SO_2) was discontinued in September 1989 and moved to another location. Since the O_3 readings were low and resources were needed for other purposes, the department decided to discontinue O_3 monitoring.

2.5 LEAD AREAS

2.5.1 AQCR 142 - SOUTHWESTERN MONTANA

2.5.1.1 LEWIS & CLARK COUNTY

Lead is a pollutant of concern in East Helena. The source of lead is predominately from the Asarco primary lead smelter. The EPA promulgated ambient air quality standards for lead on October 5, 1978. The East Helena area violated the lead standard based on ambient monitoring. The department conducted extensive studies to determine the proper source apportionment in the early 1980s. These studies included the chemical mass balance technique. The results indicated that re-entrained road dust and soil, fugitive ore concentrates, zinc oxide material and blast

furnace upsets were the primary lead sources. A SIP was developed and approved by EPA in 1984 which contained control strategies designed to bring the area into compliance.

As of December 31, 1986, all the control strategies in the plan were implemented. Unfortunately, ambient air monitoring data for 1987 and 1988 indicated that while lead levels decreased they still remained above the standard. As a result, EPA notified Montana on October 1, 1988, that the East Helena lead SIP was inadequate. During the last half of 1990 and the first half of 1991, the state and the companies involved conducted ambient monitoring, emission inventory estimations, source apportionment studies, meteorological data collection, and dispersion modeling in support of a new SIP.

The current monitoring network consists of the following sites: Hadfield (30-049-0719), Firehall (30-049-0714), Dartman Field (30-049-0724), Old Railroad (30-049-0726) and Microwave (30-043-0903). From July 1, 1990 until March 31, 1991, these sites (except for Hadfield) operated on an every day sampling schedule. The samplers were run using quartz filters rather than the usual fiberglass filters for TSP samples. Using the quartz filters allowed a laboratory to use X-ray fluorescence (XRF) to analyze for the various chemical constituents. The results of the analyses were used with chemical mass balance techniques to apportion sources.

In conjunction with the ambient monitoring, Asarco did extensive meteorological data collection at four sites. Three of the met sites were next to the lead/TSP monitors. The company is also doing extensive emission inventory work to determine daily emission estimates from the various sources. The emission data has been combined with the meteorological data to run a dispersion model to determine concentrations downwind of the facility. Receptor modeling information (CMB) was performed and compared with the dispersion modeling. At present, an effort is being made to reconcile differences between the two models. Final control strategies will be determined based on the analysis of this data and consultation with the company and EPA. The date for submittal of a new SIP document to EPA is scheduled for February, 1992.

In a letter to EPA dated May 31,1991, the department proposed several modifications to the East Helena TSP/Pb network. The department proposed shutting down the Hadfield, Dartman Field, and Microwave sites at the end of June, 1991. The department intended to keep Firehall and Old Railroad but reduce the frequency to every other day. Old Railroad may be moved to another site pending the results of the lead modeling study. The department felt that a smaller network at the maximum concentration sites would provide adequate coverage in the East Helena area.

EPA responded in a letter dated August 14, 1991. They agreed to allow the department to shut down Microwave but wanted the department to continue the other sites. They also wanted to activate another site in the area of the old Hastie site (30-049-1002). An SIP provision required the state to run Hadfield, Dartman Field, Firehall and Hastie. Hastie had been shut down in 1985 due to siting difficulties. The department responded in a letter dated September 9, 1991 and wanted to review modeling before establishing another site in the Hastie area.

2.6 PARTICULATE (PM-10 AND TSP) AREAS

As mentioned in Section 1.2.1, atmospheric particulate matter is the largest air pollution problem in the state and has historically received the highest priority from the department. In some portions of the state, there is a total suspended particulate (TSP) record dating back to 1970. From this long historical data base, the department has learned many of the significant factors that contribute to particulate pollution in Montana. It is clear that the most important factor is a combination of meteorology and topography. Mountain valleys and frequent persistent temperature inversions often lead to particulates being "trapped" close to their emissions source for days at a time. The ensuing particulate matter build-up has caused many communities with relatively small particulate emission rates to exceed federal particulate standards.

Presently, a majority of the department's particulate monitoring is conducted in the state's western mountainous region. In the 1970s and 80s, a considerable TSP network was run by the department throughout the state. It was found, however, that few areas in the eastern portion of the state had concentrations close to primary or secondary TSP standards.

Particulate monitoring has now evolved into sampling for inhalable particles known as PM-10, due to the promulgation of a new ambient air quality standard for particulate matter on July 31, 1987. These particles have an aerodynamic diameter less than 10 microns and are a subset of TSP pollution. This change forced a considerable downsizing of Montana's TSP network. The new standard required every day sampling in those areas designated as Group I, as opposed to TSP where every sixth day sampling was required. This increased the number of filters for the department staff to analyze, and also necessitated locating more than one sampler per site from a limited supply of samplers. During this downsizing, department staff prioritized the most critical areas in which monitoring should continue.

Monitoring began in the summer of 1985 at most of the current PM-10 sites. The inlets initially used had a problem where large particles "bounced" through the inlet, thereby biasing some data upward. All inlets in the network were retrofit with a factory-supplied shim during the summer of 1987.

Particulate emission sources in Montana are quite diverse. Point sources typically can be placed into one of the following categories: coal and ore mining, non-metallic mineral processing (i.e. talc, lime, and phosphate mines), wood products industries, slash burning, and wood and coal fired power generation. Although some of these sources are significant (see Appendix A), they are typically located in relatively remote areas and the threat to public health is minimal. Of greater concern in the

state are area and mobile sources. Examples of area sources include re-entrained road dust and residential wood combustion. Mobile sources generally include tailpipe emissions. These sources in combination with localized point sources are the cause for most of the PM-10 problems in Montana.

The following subsections present brief descriptions of the particulate monitoring sites which have been operated or overseen by the department. Included in the descriptions are summaries of the sources that have impacted the areas, relevant topographic and meteorological information, discussions of the data collected, and future recommendations for the sites.

2.6.1 AQCR 140 - SOUTH CENTRAL MONTANA

2.6.1.1 YELLOWSTONE COUNTY

Yellowstone County is located in south central Montana and is bisected by the Yellowstone River. The major cities in Yellowstone County are Billings (population approx. 81,000) and Laurel (population approx. 5,600) which are located along the Yellowstone valley floor. On the north and south edges of the valley, the rimrocks rise abruptly above the valley floor. The valley is approximately 12 miles wide in Laurel but on the eastern edge of Billings, the rimrocks form a constriction that is only about one mile wide. The prevailing winds are from the southwest and are channeled down the valley. The winds are usually responsible for good dispersion but temperature inversions do occur.

Particulate monitoring has been conducted in Yellowstone County since 1971. Initial sampling was performed using the standard hi-vol samplers for TSP. There have been several TSP sites in Yellowstone County but only those in the central part of Billings showed elevated concentrations. After the passage of the 1977 Clean Air Act Amendments, a portion of downtown Billings was designated non-attainment for the secondary TSP standard. Emission inventories and modeling showed that road dust from paved roads was the major contributor to TSP. The SIP called for an extensive street sweeping and flushing program to bring the area into compliance.

On July 31, 1987, EPA promulgated new standards for PM-10. EPA used PM-10 to TSP ratios and statistics to determine if areas had a probability of exceeding the PM-10 standards. Billings and Laurel were designated Group III (having less than a 20% chance of exceeding the standards). Because of the probability statistics, the department made a request to EPA to have the secondary TSP non-attainment area redesignated to unclassified. EPA asked that the state withdraw the request and pushed for additional PM-10 monitoring. The department requested that EPA

rerun the probability calculations and make a second determination but the EPA never followed up on this request.

In 1986, PM-10 monitoring was started at the Grand Avenue School site (30-111-0072) in Billings. After this site was terminated, the sampler was moved to the Scottish Rites site (30-111-0073). The PM-10 data showed no exceedances of the standards.

In November, 1989 the Yellowstone County Air Pollution Control agency started operation of a microscale PM-10 sampler on the Billings Federal Credit Union (30-111-0077) on 4th Avenue North to determine compliance with the PM-10 standard at a maximum concentration site. Information from this site will be used as part of a redesignation request to attainment. The site is currently operated on a one-in-six day schedule.

The YCAPC currently runs two TSP sites with long standing data bases: one at the City Hall site (30-111-0008) and the other at the Laurel Junior High (30-111-1001). Since TSP is no longer a standard, the department recommends that these samplers be terminated by the end of 1991.

2.6.2 AQCR 141 - NORTH CENTRAL MONTANA

2.6.2.1 CASCADE COUNTY

Cascade County is located in central Montana and at the southern end of AQCR 141. The city of Great Falls, second largest in Montana with a population of 55,000, is located at the confluence of the Missouri and Sun Rivers. The municipal airport and National Weather Service office are located on a plateau between the Missouri and Sun River Junction. This plateau is about 200 feet higher than most of the immediate valley area, and the airport is about two miles southwest of the Sun and Missouri River Junction. Except to the north and northeast, the valley is encircled by mountain ranges which lie about 30 miles away from east to south, 40 miles to the southwest, and 60 to 100 miles distance from west to northwest. Topography plays an important part in the climate of Great Falls. The Continental Divide to the west, and the Big and Little Belt Ranges to the south are primary factors in producing the frequent wintertime chinook winds observed in this part of Montana. The combination of valleys and plateaus in the immediate area contributes to marked temperature differences between the airport and the city proper. This occurs either on calm clear mornings or when chinooks winds reach the airport before they are felt at the lower elevations in town. The prevalence of chinook winds creates a relatively high average wind speed which promotes good ventilation in the community a majority of the time.

Particulate monitoring has been conducted in Cascade County since 1971. Initial sampling used the standard hi-vol TSP samplers. There have been several TSP sites in Cascade County but only those in the central part of Great Falls and Black Eagle had elevated concentrations. After the passage of the 1977 Clean Air Act Amendments, a portion of downtown Great Falls was designated non-attainment for the secondary TSP standard. Emission inventories and modeling showed that road dust from paved roads was the major contributor to TSP. The SIP called for an extensive street sweeping and flushing program to bring the area into compliance.

On July 31, 1987, EPA promulgated new standards for PM-10. EPA used PM-10 to TSP ratios and statistics to determine if areas had a probability of exceeding the PM-10 standards. Great Falls was designated Group III (having less than a 20% chance of exceeding the standards).

In 1985, PM-10 monitoring started at the Downtown site (30-013-0017) in Great Falls. The site continued until 1988. In February 1988, there was an exceptional event (dust storm) which caused very high TSP readings especially at the Fire Station #1 site (30-013-0009). The department analyzed the TSP and PM-10 data and determined that the Fire Station #1 site was the maximum concentration site for Great Falls. A request was made to EPA to allow the department to move the PM-10 sampler to the Fire Station. The PM-10 data to date has shown no exceedances of the standard.

The Cascade County Health Department (CCHD) ran two TSP sites in 1990: one at the Downtown site (30-013-0017) and the other at the Sunnyside School (30-013-1024). The Sunnyside School site had siting problems and concentrations were low; the department and CCHD decided to shut down this site on 4-5-90. The department and CCHD believe that since there is no longer a TSP standard, the Downtown TSP site should also be discontinued. This site was terminated on 7-2-90.

2.6.3 AQCR 142 - SOUTHWESTERN MONTANA

2.6.3.1 BEAVERHEAD COUNTY

The principal air quality concern in Beaverhead County centers around industrial activity six miles south of the city of Dillon. Dillon and the industrial concerns are situated in the middle of the Beaverhead valley. The valley floor is at about 5400 feet in elevation with relatively low (6700 feet) rolling mountains located ten miles to the west. Although higher mountain ranges such as the Pioneer, Snow Crest and Ruby are

nearby, Dillon projects a wide open spaces image. The industrial sources south of Dillon include the Pfizer talc plant, the Stoltze sawmill and an agriculture fertilizer supplier.

In September 1984, a monitoring site for TSP was established at the Beaverhead County Courthouse (30-001-0001). This site ran for two years until June 1986. The monitoring data showed relatively low readings and continued monitoring was not warranted.

Complaint investigations and inspections by department personnel have indicated that there might be concerns of air quality levels around the industrial area south of Dillon. Depending on resources and equipment availability, the department will attempt to install a PM-10 sampler in the vicinity of the industrial concerns.

2.6.3.2 DEER LODGE COUNTY

The principal air pollution concern in Deer Lodge County centers around the city of Anaconda. Anaconda has a population of approximately 10,000 and is situated at the southern end of the Deer Lodge valley. Anaconda was the home of a large copper smelter that operated here for nearly 100 years. The smelter closed in 1980 and has since been put on the Superfund National Priority List.

Since the shutdown, all smelter buildings have been demolished and much reclamation has occurred. The Arco Coal Company now owns the property and is the responsible party.

The department monitored for particulates at several locations since the early 1970s while the smelter was still operating. Two of the primary sites were at Lincoln School (30-023-0007) and Highway Junction (30-023-0004). The Highway Junction site was primarily an SO_2 monitoring station where the department located a TSP monitor to address possible blowing tailings. The Lincoln School site was established during the Montana Air Pollution Study (MAPS) to address health effects versus air pollution levels. Although the smelter was shut down in 1980, these sites were kept active for a few years due to public interest. The Lincoln School site was shut down in 1985 because Arco operated a duplicate sampler at this location. The Highway Junction sampler operated until 1987 when it was shut down because department resources were reallocated due to the new PM-10 standard.

Shortly after the EPA promulgated the new PM-10 standards on July 31, 1987, the EPA designated Anaconda as a Group II area. A PM-10 Group II area supposedly has a probability of between 20-95% of exceeding the PM-10 standards. A Group II designation requires every other day sampling.

The department did not concur with this designation and tried to get it reassigned to Group III. The EPA disagreed with the department's arguments and stood by its decision. In the meantime, EPA Superfund staff were working with the ARCO Coal Company to develop a multi-disciplinary monitoring plan for proposed clean-up activities. The department provided input to the plan and ARCO agreed to start PM-10 monitoring in the Anaconda area.

Currently, the network consists of four PM-10 sites as follows: Teressa Ann Terrace (30-023-0010), Mill Creek (30-023-0706), Kortum Storage (30-023-0714) and Zinc Storage (30-023-0011). A network modification request form was submitted to EPA for Teressa Ann Terrace and this site was approved with conditions. The company reports this data to the department which is then updated to AIRS. To date, all four monitoring sites have recorded very low PM-10 levels.

The department feels that PM-10 at the Teressa Ann Terrace site no longer needs to be sampled on an every other day schedule. For the levels recorded at this site, sampling once every six days is adequate for the PM-10 Group II area. The department will discuss this with Superfund staff and decide on the appropriate sampling frequency.

2.6.3.3 GALLATIN COUNTY

The area of concern in Gallatin County centers around the cities of Bozeman and Belgrade. Bozeman (population 23,000) lies at the eastern edge of the Gallatin valley and is home to Montana State University. Bozeman does not have any major air polluting sources but does have problems with traditional area-wide sources such as emissions from paved and unpaved roads and residential wood combustion. Belgrade with a population of 2,400 lies approximately nine miles west of Bozeman. Belgrade has one major air pollution point source -- Plum Creek's sawmill. Belgrade's main particulate emission sources include paved and unpaved roads, residential wood combustion and the sawmill.

Like many areas in the western part of the state, the Gallatin valley experiences temperature inversions in the fall and winter months. The dimensions of the Gallatin valley are approximately 12 by 20 miles. This large area will allow pollutants to disperse with moderate to fast wind speeds. However, during calm inverted conditions pollutants can build up and cause problems around the cities.

The department has been monitoring for particulates in Bozeman since 1978. The primary site has been at the East Main City Building (30-031-0002). Other locations were also monitored for TSP; they include Whittier School (30-031-0005) and Christie Fields (30-031-0007). The East Main site has proven to be the worst-case site in Bozeman. In 1985, the department installed a PM-10 monitor at this site. It has operated on a one-in-six day schedule and has been within the PM-10 standards. In 1987, when the PM-10 standard was promulgated, the department discontinued TSP monitoring at the East Main site and Christie Fields. In 1987, EPA also designated Bozeman as a Group III area (having less than a 20% chance of exceeding the PM-10 standard).

The City of Bozeman conducts daily wintertime TSP monitoring at the East Main site as part of a voluntary wood stove emission reduction program and due to the interest of the community. This data is not reported to AIRS due to quality assurance deficiencies but occasionally it shows elevated readings. The city plans to continue this voluntary program in the future.

Due to the high TSP readings measured by the city and the need to obtain additional data in this fairly large Montana city, the department installed a second PM-10 sampler at the East Main site on January 11, 1991. This will allow an increase of sampling frequency from one-in-six days to every other day during the first and fourth quarters. Network modification request forms will be sent to EPA for their approval.

In Belgrade, the department received many complaints and a petition signed by approximately 300 persons to "monitor and do something about air quality in Belgrade." Although the community is quite small, it has experienced some urban sprawl from nearby Bozeman. The city does have one major saw mill whose emissions include a wood-fired boiler and dust from the log deck. The main concern voiced by the citizens centered on dust from paved and unpaved roads. During the spring of 1991, the department investigated several potential site locations for a proposed PM-10 sampler. The preferred site location was behind a grain elevator in an open field. The potential site is city-center, near main traffic corridors and near industry. Currently, the department is negotiating a lease agreement with the landowner. The state will submit the appropriate site modification request forms to EPA for their approval.

2.6.3.4 JEFFERSON COUNTY

Particulate concerns in Jefferson County center around area sources in the northern part of the county. This part of the county serves as a community for persons living near and commuting to Helena. The northern part of Jefferson County includes the unincorporated communities of Montana City and Clancy as well as several adjacent subdivisions. These communities are located along the Prickley Pear Creek drainage with the Continental Divide range to the west and the Elkhorn Mountains to the east. Drainage winds tend to funnel the airflow on a north-south axis although the area experiences calm winds due to temperature inversions.

The residents of the area are linked to Interstate 15 by several paved and unpaved roads. Some of the paved roads are in fair to poor condition. In addition, many residents use wood stoves or fireplaces as a heat source during the winter months. These area sources have the potential to cause elevated particulate concentrations. Depending on resources and equipment availability, the department may install a PM-10 sampler in Clancy in 1992. The department will send EPA the appropriate network modification request forms to document this site.

2.6.3.5 LEWIS & CLARK COUNTY

Particulate problems in Lewis & Clark County center around the cities of Helena (population 25,000) and East Helena (population 1,500). These two communities are situated near the southern end of the Helena valley. The valley is fairly wide (approximately 16 miles by 16 miles), lies east of the Continental Divide and is surrounded by mountains on all sides. Wintertime dispersion conditions are generally favorable due to the fact that the city often gets chinook winds. These winds

usually keep inversions from setting in for long periods of time. However, nighttime inversions and inversions lasting for a few days are common. Predominant wind directions are from the northwest through southwest.

Particulate monitoring has been conducted in Lewis & Clark County since 1970. Initial sampling was performed using the standard hi-vol samplers for TSP. The mainstay of the particulate monitoring network in Helena has been at the Cogswell Building (30-049-0001) near the state capitol building. There have been several other sites in Helena (some of which were associated with Lewis & Clark County's wood stove curtailment program). Starting in 1991, the department will add Lewis & Clark County Health Department's PM-10 site to its list of SLAMS reporting stations. The state has made an agreement with Lewis & Clark County to weigh the quartz filters to ensure quality assured data. This site is at the Lincoln School (30-049-0018) in Helena and is near commercial areas and traffic corridors.

A considerable amount of particulate sampling has also been conducted in the East Helena area. Most of this particulate sampling has been conducted in connection with lead analyses around Asarco's primary lead smelter. In 1978, East Helena was designated non-attainment of the secondary standard for TSP. No special control strategy was implemented since the emission inventory demonstrated over 50% of the particulate emissions were from nearby highway construction. In addition, Asarco agreed to reduce TSP emissions from slag piles by spraying the piles with water or dust suppressants. The TSP data collected in East Helena since 1981 has shown compliance with the primary TSP standard but there were still some exceedances of the secondary standard.

On July 31, 1987, EPA promulgated new standards for PM-10. EPA used PM-10 to TSP ratios and statistics to determine if areas had a probability of exceeding the PM-10 standards. Helena and East Helena were designated Group II (having a probability between 20% and 95% chance of exceeding the standards). The Group II status required the department to conduct every other day PM-10 sampling. The department contracted with Lewis & Clark County Health Department to conduct an emission inventory for the county. This work is expected to be completed by August 1992.

PM-10 sampling has been conducted in Helena since 1985. Initial sampling at the Cogswell Building was conducted on a one-in-six day sampling frequency but was increased to every other day in the fall of 1987 due to the Group II designation. Later on, the department learned that the Group II designation also applied to East Helena. TSP samplers were used as surrogate PM-10 samplers until April 1988 when a TSP reading exceeded the twenty-four hour PM-10 standard. This exceedance required the

department to install two PM-10 samplers run every other day at the Hadfield site. This was done in July 1988.

In November 1989, two additional TSP/Pb samplers were installed in the East Helena area. These were the Old Railroad and Microwave (actually in Jefferson County) sites. The purpose of these sites is more lead rather than particulate related.

From July 1, 1990 until March 31, 1991, the East Helena sites (except for Hadfield) operated on an every day sampling schedule in support of data collection for the lead SIP. Since most of that effort has been completed, the department proposed shutting down three of the TSP/Pb sites in East Helena. This request was made in a letter to EPA dated May 31, 1991.

EPA responded in a letter dated August 14, 1991. They agreed to allow the department to shut down Microwave but wanted the department to continue the other sites. They also wanted to activate another TSP/Pb site in the area of the old Hastie site (30-049-0002). An SIP provision required the state to run lead (and TSP) sites at Hadfield, Dartman Field, Firehall and Hastie. Hastie had been shut down in 1985 due to siting difficulties. The department responded in a letter dated September 9, 1991 and wanted to review modeling before establishing another site in the Hastie area.

The department decreased sampling frequency at the Cogswell Building site from every other day sampling to every sixth day sampling on 10-1-90. The concentrations observed at this site warranted this change in sampling frequency. This network change allows department personnel to have convenient hands-on experience with the samplers and maintain a historical data base.

Except for a few changes, the department intends to continue to run its current network of TSP and PM-10 sites in Lewis & Clark County and feels that it is adequate for SIP development purposes and compliance tracking.

2.6.3.6 POWELL COUNTY

The air quality concern in Powell County centered around the collection of background TSP and PM-10 data in the western half of the state. The department established a background site for TSP in 1980 at the Terry Smith ranch (30-077-0024) near Ovando. This site was located in the sparsely populated upper Blackfoot River valley. The area is used almost exclusively for hay production and livestock grazing. In 1985, the department installed a PM-10 monitor at this site to measure background PM-10 and to develop a relationship between background TSP and background PM-10. The site may not have been truly "background"; some high readings were caused by a nearby woodstove and by

livestock movement. The site continued operating until September 1987. At that time, the EPA promulgated the PM-10 standard and the sampler was needed at a higher priority Group I area.

It would be desirable to re-establish a background PM-10 site at some western Montana location in the future. The department acknowledges the use of background monitoring for SIP demonstration projects; however, sites need to be community specific and probably can not be served by a single, regionally based site.

2.6.3.7 SILVER BOW COUNTY

Butte is a city with a population of approximately 33,000. The elevation averages 5300 feet with the Continental Divide surrounding the city on three sides. Wind speeds in Butte are usually low and the area is susceptible to temperature inversions in the fall and winter. The old part of Butte is built on a hillside next to the Berkeley Pit. The new part of town is built on the "flats" to the south and is where much of the strip development is located.

Particulate monitoring has been conducted in Silver Bow County since 1971. Initial sampling employed the standard hi-vol TSP samplers. There have been several TSP sites in Silver Bow County over the years. These included sites in the city-center part of Butte, in Walkerville (above Butte), out on the flats by the airport, and in Ramsey (by Rhone-Poulenc). There has also been monitoring conducted by companies associated with the mining activities in Butte.

In 1978-80, the department conducted TSP monitoring in Butte as part of the Montana Air Pollution Study (MAPS). The network consisted of five sites in the city center. The department has observed that the city center and more specifically the Greeley School site (30-093-0005) had the highest particulate concentrations. The department decreased its network to this single site in 1984.

Butte was designated non-attainment for TSP based on data from the Greeley School site. A plan was developed and submitted to EPA which called for a permit from the Anaconda Minerals Company (ARCO) and street paving and sweeping by the city of Butte.

After the plan was implemented, TSP concentrations initially showed compliance with the standards. The department submitted a redesignation request but disagreements with EPA over modeling for the attainment demonstration delayed any formal action. In the meantime, the source mix for particulates in Butte changed from predominantly industrial sources to area sources. This was

due to closure of the Berkeley Pit and the Weed Concentrator and an economic downswing in the community. In 1985, levels of TSP started to increase. Also in 1985, the department started to monitor for PM-10 at the Greeley School site concurrent with the TSP monitoring.

In 1986, Montana Resources, Inc. purchased all of Arco's holdings in Butte and reopened the ore processing facilities and the new Continental Pit. Montana Resources was obliged to operate under Arco's old permit conditions.

On July 31, 1987, EPA promulgated new standards for PM-10. EPA used PM-10 to TSP ratios and statistics to determine if areas had a probability of exceeding the PM-10 standards. Butte was designated Group I and was considered to have greater than 95% chance of exceeding the standards.

The Group I designation required the state to conduct daily monitoring for PM-10 and to submit a plan to bring the area into compliance. The department started daily sampling at the Greeley School site in September, 1987. During the winter of 1987-88, the department conducted a source apportionment study in Butte. The study involved collecting particulate data using dichotomous samplers. The sources were then apportioned through chemical mass balance and optical microscopy techniques.

The department is currently working on a PM-10 SIP for Butte. To date, an emission inventory has been completed and submitted to EPA. The control strategy will include controls on residential wood combustion, paved and unpaved roads and new operating permits for Montana Resources and Rhone-Poulenc. The department plans to submit the final SIP by November 15, 1991.

As part of the SIP, an emission inventory for PM-10 was conducted in Butte. The inventory identified an additional "hot spot" for PM-10 emissions in a residential area near the Harrison Avenue-Interstate 90 intersection. During January 1991, the department established a PM-10 site in the maximum emission grid for Butte. This site named Butte-Greenhouse (30-093-0008) is located in an open field near the Harrison Avenue-Interstate 90 intersection. The department (and EPA) feels that this site is needed for an attainment demonstration. The department submitted a network modification request to EPA for this site on 1-13-91. The EPA approved this request on 2-13-91. The first sample was taken on 1-5-91.

In March 1988, the department requested approval to move the PM-10 samplers from the roof of the Greeley School onto a roof of a sampling shelter located in the school playground. EPA agreed with this move and the samplers were moved in December 1988. The

department also requested a move of the collocated PM-10 sampler from the Helena Cogswell site to Greeley School. This sampler was moved in November 1989.

2.6.4 AQCR 143 - EASTERN MONTANA

2.6.4.1 DANIELS COUNTY

Particulate data was collected in Daniels County from 1975 until 1987. The particulate data was collected as part of background and source impact studies centered around two coal-fired power generating plants located north of the U.S.-Canadian border near Coronach, Saskatchewan. In 1975, the department initiated TSP monitoring near Scobey as part of the Poplar River Basin Environmental Impact Study. At one time there were three sites in the network. The sites were temporarily shut down from June, 1983 to July, 1984 and again from June, 1985 to July, 1986. From September, 1986 until July, 1987 the department operated one site at the Marlenee ranch.

In 1984, the coal-fired power plants went into production. Data since that time has shown little impact from these sources. The topography of the land north of Scobey is flat to rolling and is used for the growing of grains. The flat terrain lends itself to being a well ventilated area. The power plants have control equipment for particulates so little impact is expected from these sources. TSP data collected after the facility went into operation saw little to no impact from the sources and would be considered background for this area. There were no exceedances of the NAAQS or MAAQS.

After the study was completed in 1987, the TSP monitors were removed. At present, the department has no plans to re-establish particulate monitoring in this area.

2.6.4.2 RICHLAND COUNTY

The air quality concerns in Richland County center around Sidney. Sidney (population 5,200) is situated near the Yellowstone River in far eastern Montana near the North Dakota border. In the late 1970s and early 1980s, the area experienced an economic upturn due to oil and gas exploration and development. Much of this upturn has since died down due to gas price stabilization. Other industrial sources in the Sidney area include Montana Dakota Utilities (coal-fired power plant) and Holly Sugar (sugar beet processing facility).

In 1983, the department installed a hi-vol sampler in downtown Sidney (30-083-0010). This site operated until September, 1987. At this time the PM-10 standard had been

promulgated by EPA and the department felt that its resources were better applied to PM-10 problems in the western valleys.

In looking at the data, the TSP concentrations were higher in Sidney than in other communities in eastern Montana. In April, 1987, there were two high readings. Upon investigation, these concentrations were caused by wind-blown fugitive dust emissions. The majority of these TSP concentrations were probably greater than ten microns in size. The department feels that PM-10 concentrations would be within the NAAQS. If the area should experience another economic upturn, the department may consider installing a PM-10 sampler in downtown Sidney.

2.6.4.3 ROSEBUD COUNTY

The air quality concern for particulates in Rosebud County centers around the cities of Colstrip and Ashland. In Colstrip there are four coal-fired power generating plants and two large coal mines. Montana Power Company, Western Energy and Peabody Coal Company have operated particulate sampling networks around their facilities as conditions of their permits. In Ashland, there has been recent concern due to point source emissions from a tepee burner and area sources including wood and coal burning stoves.

In 1978, the Colstrip area was designated non-attainment of the primary standard for TSP based on the MPC #3 site in downtown Colstrip. A plan was submitted which involved permit modifications and control strategies for the nearby coal mines.

In 1984, the department in cooperation with the three companies submitted a request to have the area redesignated attainment for the TSP standards. The EPA reviewed and then approved this request on April 26, 1985. The change in status from non-attainment to attainment applies only to the primary standard and the area remained non-attainment for the secondary TSP standard.

On July 31, 1987, EPA promulgated new standards for PM-10. EPA used PM-10 to TSP ratios and statistics to determine if areas had a probability of exceeding the PM-10 standards. Colstrip was designated Group III (having less than a 20% chance of exceeding the standards). Because of the probability statistics, the department made a request to EPA to have the secondary TSP non-attainment area redesignated to unclassified. EPA asked that the state withdraw the request and pushed for additional PM-10 monitoring. The department requested that EPA rerun the probability calculations and make a second determination. EPA never followed up on this request.

The department, in return, requested Montana Power to install and operate a PM-10 site at their MPC #3 site (30-087-0700). A sampler was installed in December 1989 and the data is submitted to the department. After a data base has been established, the department will review this data for compliance with the PM-10 NAAQS.

Ashland is a small town with a population of approximately 1,000. The city is located along the Tongue River between the Northern Cheyenne Indian Reservation to the west and the Custer National Forest to the east and south. Ashland is located 21 miles east of Lame Deer which is a PM-10 Group I area. The state has no jurisdiction on the tribal lands regarding air quality and plans are being made to bring the area into compliance through tribal and federal offices. Ashland has many of the same source and topographical influences as Lame Deer. Contributing sources include re-entrained road dust, wood and coal burning and an industrial tepee burner. Depending on resources, the department may install a PM-10 sampler in Ashland.

2.6.5 AQCR 144 - NORTHWESTERN MONTANA

AQCR 144 includes Flathead, Lake, Lincoln, Mineral, Missoula, Ravalli and Sanders counties. This part of Montana is very mountainous and heavily forested. The valleys of northwestern Montana have the poorest atmospheric dispersion conditions of anywhere in the state. High particulate concentrations have historically plagued this area. Two areas were originally designated non-attainment areas for TSP. Now, AQCR 144 has four PM-10 Group I areas and three PM-10 Group II areas (two with exceedances). The department has devoted much time and resources to solving the particulate dilemma in northwest Montana.

2.6.5.1 FLATHEAD COUNTY

The particulate problems in Flathead County center around the communities in the greater Flathead valley. These communities include Kalispell, Columbia Falls and possibly Whitefish.

Kalispell is the largest city in the Flathead valley with a population of approximately 12,000 persons. There are perhaps an additional 10,000 people living within three miles in unincorporated areas. Kalispell is the commercial center for the area and serves the towns of Columbia Falls, Whitefish, Bigfork and Somers. The Flathead valley is wide (14 miles across), but since it is west of the Continental Divide, the climate is mild

with generally calm winds. Like many communities in the western part of the state, the area is susceptible to temperature inversions in the fall and winter.

Particulate monitoring has been conducted in Kalispell since 1971. Initial sampling was performed using the standard hi-vol samplers for TSP. There have been several TSP sites in the central part of Kalispell over the years. Many of sampling sites showed exceedances of the NAAQS for TSP. After the Clean Air Act Amendments were adopted in 1977, Kalispell was not designated non-attainment due to fugitive dust exemptions.

From 1977 to 1982, Kalispell was one of the communities involved with the Flathead River Basin EIS. Monitoring was conducted at several locations in the basin and it was determined that most high concentration sites were associated with anthropogenic sources in the city centers.

The Kalispell site is at the old Universal Athletics location (30-029-1015) in the downtown area within one block of U.S. Highway 93. The TSP monitor operated from 1980 until 1987. In 1985, the department installed a PM-10 sampler at this site and ran it concurrent with the TSP sampler. Anticipating promulgation of new PM-10 NAAQS, the department initiated a source apportionment study in Kalispell in 1986 and 1987. On July 31, 1987, the EPA promulgated a new standard for PM-10 and later designated Kalispell a Group I area. The Group I designation required the department to conduct daily sampling and to develop an SIP which would identify source contributions and propose enforceable control strategies within a specific time frame.

A PM-10 SIP for Kalispell was submitted to EPA on June 29, 1990. The source apportionment study identified re-entrained road dust as the predominant source followed by residential wood combustion. The control strategy developed for the area included a sanding material specification, a sweeping and flushing ordinance, and a construction and demolition permitting requirement for dust control. EPA reviewed the SIP and returned it as incomplete on January 22, 1991. They noted that the control strategies were unenforceable by the state. This problem will be remedied and a new SIP will be submitted to EPA by November 15, 1991.

The department will continue PM-10 monitoring at the Universal Athletics site to document maintenance and attainment of the standard. The department considers the Universal Athletics site to be located at the maximum concentration area in Kalispell. The department has no plans to establish another site in Kalispell.

Columbia Falls is an industrial town of about 3,000 people located in the northeast corner of the Flathead valley. In the vicinity of Columbia Falls are a plywood-particle board-sawmill complex, an aluminum reduction plant and two other sawmills. Wind patterns in the area are dominated by drainage winds through Badrock Canyon to the east and through a gap north of town which drains the North Fork of the Flathead River. Like Kalispell, the area is susceptible to temperature inversions in the fall and winter months.

Particulate monitoring has been conducted in Columbia Falls since 1971. Initial sampling was performed using the standard hi-vol TSP samplers. There were two principal sites over the years. These were at the Anders Residence (30-029-0005) and the Junior High School (30-029-0003). Both sites showed exceedances of the NAAQS for TSP. After the Clean Air Act Amendments were adopted in 1977, Columbia Falls was designated non-attainment of the primary TSP standard based on data from the Anders Residence site.

In 1979, a microinventory was conducted which identified fugitive dust from paved and unpaved streets as accounting for over 90% of the TSP. The control strategy for this area involved the rebuilding of Highway 40 and Nucleus Avenue through Columbia Falls. The paving project for Nucleus Avenue was completed in late fall of 1982 and Highway 40 was finished in the fall of 1984. Following completion of these projects, the annual average for TSP decreased in 1985 but then again rose in 1986 and 1987. The department suspects that other factors may be influencing the concentrations.

In May 1985, the department installed a PM-10 sampler at the Junior High School (a site that had seen high concentrations in the early 1970s). In October 1985, the department also installed a TSP sampler at the same site. For years the Anders site had been the principal site but had some siting disadvantages. It was located below Nucleus Avenue and was perched on a steeply pitched roof which presented safety problems. After two years of collecting TSP data at the Junior High School site, the department compared Junior High versus Anders and determined that they were measuring the same air mass. To continue tracking particulate levels in Columbia Falls, the department decided to shut down the Anders site and rely solely on the Junior High School site.

On July 31, 1987, the EPA promulgated a new standard for PM-10 and later designated Columbia Falls a Group II area. The Group II designation required the department to conduct every other day sampling and to develop a committal SIP. In October 1987, the 24-hour PM-10 standard was exceeded. Consequently, the area is considered a "Group II with exceedances" which makes it equivalent to a Group I area. The quarter following the

exceedance, the department commenced daily sampling. From September 1989 until April 1990, the department conducted a source apportionment study in Columbia Falls. The department has contracted with a laboratory to do chemical analyses and CMB receptor modeling. The results of this modeling will be available in July, 1991. The department has completed an emission inventory and will submit this information to EPA. The result of the CMB and emission inventory studies will identify source contributions and the SIP will contain enforceable control strategies.

The department continues to operate the PM-10 samplers at the Junior High School site. Ambient PM-10 data from 1988 through 1990 has shown no violations of either the annual or short-term PM-10 standards. The department will continue to operate the PM-10 site at its present location and will use it for attainment and maintenance demonstrations.

Whitefish is a city of approximately 4,300 people located at the northwest corner of the Flathead valley. Whitefish is not a major commercial or industrial center but is a year-around tourist destination. Like Kalispell and Columbia Falls, the area is susceptible to temperature inversions in the fall and winter months. The source apportionment study in Kalispell showed that re-entrained road dust and residential wood combustion are major and minor contributors, respectively, to ambient particulate concentrations. Whitefish could possibly have the same source mix and concentrations as Kalispell.

As part of the Flathead River Basin EIS, the department measured TSP in Whitefish from 1981 to 1983. The data showed that the area was in compliance with the TSP NAAQS. The department believes that the site was not located in the maximum concentration area. As a result of the 1990 Network Review, the department decided to install a PM-10 site in Whitefish. This new site is located in the central business district in Whitefish. The department decided to install this site due to public concern and Whitefish's proximity to other PM-10 Group I areas at Kalispell and Columbia Falls. Start date was April 30, 1991. Network modification request forms will be sent to EPA for their approval.

2.6.5.2 LINCOLN COUNTY

The particulate problems in Lincoln County center around the communities of Libby, Eureka and Troy.

Libby is a small city with a population of approximately 2,500 persons. It is located along the Kootenai River in extreme northwestern Montana. The Kootenai valley runs approximately east to west in Libby and is only about 2 miles wide. The area around Libby has probably the worst ventilation of any community

in Montana. During the fall and winter months, the winds are almost always calm or very light. This, along with persistent temperature inversions, cause pollutant levels to build up in the relatively narrow valley.

Particulate monitoring has been conducted in Libby since the mid 1970s. The principal TSP sites were at the Brown Residence (30-053-0010) and the Lincoln County Courthouse (30-053-0012). Concentrations recorded at these sites exceeded both the short-term (24-hour) and annual TSP NAAQS. In light of the high readings, the department initiated an air pollution study during the winter of 1984-85. The intent of the study was to characterize source contributions to particulate concentrations in Libby. Understandings were acquired by this study but some techniques needed to be refined and other studies were needed to correctly apportion sources.

In May 1985, the department installed a PM-10 sampler at the Courthouse site. In August 1985, the department discontinued the TSP sampler at the Brown Residence. Data analysis revealed that hi-vol TSP samplers at the Lincoln County Courthouse and the Brown Residence sites were measuring the same airshed.

In 1987, EPA promulgated new standards for PM-10. Shortly after the standards were adopted, the EPA designated Libby a PM-10 Group I area. The Group I status required that the department collect PM-10 data on a daily basis and write an SIP that would bring the area into compliance.

From October 1987 until December 1988, the department conducted a source apportionment study in Libby. This involved collecting fine particulate data and analyzing it chemically. Chemical fingerprints were collected from the various sources and the CMB receptor model apportioned the sources. As a backup to CMB, the department apportioned sources using the optical microscopy technique. The results of the study showed that re-entrained road dust and residential wood combustion were the principal sources. Presently, the department is in the final stages of putting together the SIP. The department will submit the Libby PM-10 SIP to EPA by November 15, 1991.

The department will maintain the PM-10 site on the Lincoln County Courthouse. The department believes that this site accurately depicts the maximum concentrations in Libby. The site will be used for compliance purposes to judge the attainment and maintenance of the standard. The department will also maintain a collocated sampler at this location. Since the ratio of the maximum PM-10 concentrations to the standard is greater than 1.2, the Federal Register (40 CFR 58.13) allows a less frequent sampling schedule. Starting with the third quarter of 1992, the department intends to remove one of the PM-10 samplers from the

Libby Courthouse site and drop it back to every other day sampling. The department will detail this change in a network modification request form.

Eureka is a small town in northwestern Montana with a population of approximately 950. The town is situated in some rolling hills along the Tobacco River approximately five miles upstream from Lake Koocanusa. Particulate monitoring for TSP started in 1984. Twenty-four hour concentrations exceeded the short-term TSP NAAQS on a few occasions. In 1987, the department replaced the TSP sampler with a PM-10 sampler. After a new PM-10 NAAQS was promulgated on July 31, 1987, the EPA designated Eureka a Group II area. This designation required the state to sample every other day and submit a committal SIP. The department will continue this site at its present location.

Troy is a small town 18 miles west of Libby with a population of approximately 1,100. The town is situated along the Kootenai River valley and like Libby has some of the worst ventilation in the state. Although the population is low, community leaders in Lincoln County have indicated that Troy may also have particulate levels that exceed the standard. The department intends to install two samplers at this site during the fall of 1991. The department will detail this new site in a network modification request form.

2.6.5.3 MISSOULA COUNTY

Particulate problems in Missoula County center around the city of Missoula. Missoula is situated at the confluence of the Bitterroot and Clark Fork Rivers in western Montana. The city has a population of approximately 45,000 persons. The Missoula valley is fairly narrow (approximately 6 miles across) and similar to other western Montana valleys in that it is very susceptible to temperature inversions in the fall and winter months and wind speeds are fairly calm throughout the year.

Particulate monitoring in Missoula has been conducted since 1971 at several sites in the Missoula valley. The initial TSP particulate concentrations were measured with the standard hi-vol samplers. During the early to mid 1970s, the highest concentrations were measured in the downtown area at the Courthouse Roof site (30-063-0001). In 1977, after the passage of the Clean Air Act Amendments, Missoula was designated non-attainment for the primary TSP standards based on data from this site. As part of the SIP to control TSP, the city of Missoula incorporated a systematic program of street sweeping and flushing to show attainment by 1982. Although not part of the plan, Missoula implemented several control measures directed at

emissions from residential wood combustion. The control measures brought the area into compliance with the annual NAAQS but occasionally the 24-hour standard was exceeded.

Over the years, the air monitoring network in Missoula has been quite extensive and comprehensive. The Missoula City-County Health Department (MCCHD) has monitored for particulates at several locations. These include sites in downtown Missoula [Courthouse Roof (30-063-0001) and Health Department (30-063-0031)] and south central Missoula [Rose Park (30-063-0020), Lions Park (30-063-0019), and Boyd Park (30-063-0024)]. In addition, the MCCHD has operated sites in Bonner (near a major sawmill/plywood factory), near Frenchtown (by a kraft paper pulp mill), in East Missoula, in the Rattlesnake area, in southwest Missoula near the south hills and on the western edge of the city. For years MCCHD operated daily TSP monitoring at most of their major sites and obtained profiles of pollutant trends in the Missoula valley. This was very resource intensive and the MCCHD sought ways to narrow the scope of work. In 1984, MCCHD also started collecting PM-10 data at two of their sites in addition to all of their TSP data.

In the 1986 Network Review, the department and the MCCHD suggested condensing the size of the Missoula network and focusing on certain sites that would be considered maximum concentration sites. The sites would also be used for the county's episode monitoring program. After data review, the department concluded that the Boyd Park and Rose Park sites were measuring the same airshed. This resulted in shutting down the Rose Park site and transferring the episode monitoring to the Boyd Park site. The Boyd Park site is the principal monitoring site for particulates in the south central part of Missoula while the Health Department site is the primary site on the north side of Missoula in the downtown area.

In 1987, EPA promulgated a new standard for particulate matter less than 10 microns in size (PM-10). The EPA used historic TSP and PM-10 data and computer programs to determine that Missoula had a probability of 95% or greater of exceeding the PM-10 NAAQS. This high probability resulted in Missoula being designated as a Group I area for PM-10. The Group I designation required daily PM-10 sampling (which was already being done) and preparation of an SIP with control strategies to bring the area into compliance.

During the fourth quarter of 1986 and the first quarter of 1987, the MCCHD conducted a PM-10 source apportionment study. The study showed that the major sources contributing to the PM-10 problem were re-entrained road dust from the city's streets followed by residential wood combustion during the winter heating season. Missoula's SIP was developed and submitted to EPA on June 29, 1990. EPA returned the SIP in a letter dated March 13,

1991. They noted that it was administratively and technically incomplete. In addition, they noted that the state and county do not have the authority to implement the plan and there were other problems related to enforceability. A new SIP will be completed and submitted to EPA by November 15, 1991.

The emission inventories developed in the SIP showed that the highest concentration grids are in south Missoula (where the Boyd site is located) and in downtown Missoula (where the Health Department site is located). The department and the MCCHD will continue to operate these two sites to show attainment and maintenance of the NAAQS. The MCCHD will continue to jointly operate two TSP sites with Stone Container near their Frenchtown kraft pulp paper mill as surrogate PM-10 samplers.

2.6.5.4 RAVALLI COUNTY

Particulate concerns in Ravalli County center around the city of Hamilton. Hamilton is a relatively small community (population 2,700) situated in the center of the Bitterroot valley. Hamilton is about 50 miles south of Missoula and about 300 feet higher in elevation. Hamilton often experiences much better wintertime ventilation than nearby Missoula. On many occasions, when Missoula is fogged in and experiencing high particulate concentrations, Hamilton is sunny and relatively clear. There are times, however, when temperature inversions in Hamilton may trap pollutants and cause elevated levels.

With this in mind, in 1983 the department began TSP sampling at the Ravalli County Courthouse (30-081-0001) in the city center. This was initiated in part due to citizen complaints about dust and wood stove emissions, and interest by the League of Women Voters. In 1986, the department installed a PM-10 sampler at the same location and continued to collect TSP and PM-10 data until 1987. For a western Montana valley, the department was somewhat surprised at the relatively low TSP and PM-10 readings. Maximum concentrations were observed during the winter and spring but were well within the NAAQS and MAAQS.

On July 31, 1987, the EPA promulgated new standards for PM-10. The standards required daily monitoring at Group I areas and every other day monitoring at Group II areas. With this emphasis combined with low concentrations recorded at the Hamilton site, the department discontinued both TSP and PM-10 monitoring during the fall of 1987. At present, the department has no plans to resume monitoring in Hamilton.

2.6.5.5 SANDERS COUNTY

Particulate concerns in Sanders County center around the city of Thompson Falls. Thompson Falls is a small town with a population of approximately 1,300 persons. It is situated on the north side of the Thompson Falls Reservoir, a small impoundment on the Clark Fork River. The Clark Fork valley around Thompson Falls runs east and west. Mountains rise to 7000 feet both to the north and south of Thompson Falls. Like other western Montana valleys, the area experiences temperature inversions during the fall and winter months.

The department conducted limited monitoring for TSP in the early 1970s and again in 1978. It was not until 1983 that the department established a permanent TSP site at the Sanders County Courthouse (30-089-0003). Readings collected during the first few years showed levels exceeding the NAAQS for TSP. In 1985, the department installed a PM-10 sampler at the same location. The PM-10 data from 1985 to 1987 was somewhat limited but did show compliance with the proposed NAAQS for PM-10. However, the data collected revealed that Thompson Falls had an air quality problem. The most likely sources of particulates are re-entrained dust from paved and unpaved streets, residential wood combustion, and emissions from a nearby sawmill.

On July 31, 1987, the EPA promulgated a new standard for PM-10. The EPA used historic TSP and PM-10 data and ran statistics which showed that Thompson Falls had a probability between 20% and 95% of exceeding the PM-10 NAAQS. Consequently, the area was designated as Group II for PM-10. This designation required every other day PM-10 sampling and a committal SIP.

The department started every other day sampling in October, 1987. In February 1988, the Sanders County Courthouse site recorded a concentration in excess of the 24-hour PM-10 standard. This exceedance required the state to conduct daily sampling and to develop an SIP with control strategies to bring the area into compliance. The department initiated daily sampling in July 1988.

The department performed a source apportionment study in Thompson Falls from October 1990 until April 1991. A CMB monitoring trailer was installed at the Railroad site (30-089-0005) across Main Street from the Courthouse site. In addition, the department installed a background PM-10 sampler, in an open field, at the Muster Ranch (30-089-0006) which is a few miles north of Thompson Falls. Details of these site locations will be provided to EPA.

The analysis of the source apportionment study is expected to be completed by October 1991. An SIP will then be developed and submitted to EPA in 1992.

2.7 METEOROLOGICAL MONITORING

2.7.1 AQCR 140 - SOUTH CENTRAL MONTANA

AQCR 140 is located in south central Montana and includes physical features common to all of the other AQCRs in the state. The Yellowstone and Musselshell Rivers cut through the region from west to east and the Missouri River forms the northern border. The Highwood, Big Belt, Crazy and Absaroka Mountains border the region to the west and the southern border, formed by Wyoming, includes the Beartooth, Pryor and Big Horn Mountains. To the east the boundary cuts through rolling plains and foothills and includes the south to north portion of the Musselshell River.

Due to the diverse nature of the terrain and climate in this region, dispersion characteristics are highly localized and are quite variable. Mountainous terrain can provide shelter from prevailing winds and severely limit dispersion of pollutants in one area while funnelling high winds into another to greatly enhance the dispersion. Temperature inversions which trap pollutants are common in this region throughout the year but the depth, duration and intensity vary widely from the mountains to the plains. Inversions on the plains seldom persist past noon and are usually shallow and weak. Inversions in the mountainous areas are usually much stronger and deeper and can persist for several days during the fall and winter. Wind speed and direction patterns in the mountains are typically severely affected by terrain and generalizations or comparisons to any existing measurements at other sites are not very practical. Wind patterns on the flatter portion of the region can be evaluated by comparison to existing sites and generally show the prevailing winds to be from the west and southwest.

2.7.1.1 YELLOWSTONE COUNTY

Meteorological monitoring in Yellowstone County consists of two sites operated by the department, one site operated by the Yellowstone County Air Pollution Control (YCAPC), and three sites operated by a group of Billings/Laurel industries called BLAQTC.

As stated previously, Billings and Laurel are situated along the Yellowstone River valley in south central Montana. The Yellowstone River valley runs from southwest to northeast and is a predominant topographical influence on the airflow in the area. In Billings, there are cliffs or rimrocks located both north and south of the river which also tend to cause channeling. The distance between the north and south rims ranges from about one to five miles. In Laurel, the valley tends to be a little wider and the predominant high terrain is not close by. The cities of

Billings and Laurel and all of the industrial sources are located along the river valley. Nearby terrain is often higher than the highest smoke stacks.

The department operates a 10 meter meteorological tower at its site at Coburn Road (30-111-0066). The met sensors were previously on a six foot tripod on top of the monitoring trailer. On 11-14-90, the department installed a 10 meter tower in the field near the monitoring trailer. Temperature data (at two meter probe height) is also collected at the site. The wind data analog signal is currently recorded on a chart recorder and then digitized and stored on magnetic media. The Coburn Road site is situated about 300 feet above the valley floor on the south rims. The wind data is used to determine which source or sources contributed to SO_2 readings at the site. The wind data is also being used in connection with a city sponsored SO_2 dispersion modeling study.

The department also operates met sensors at its site at Ponderosa School (30-111-0076). This site is located on a six foot tripod on top of the sampling shelter. The met sensors were previously on a pole about 12 feet above the shelter (total height 25 feet) but they were lowered to allow proper audits of the equipment. Due to safety reasons, the department will not install and guy a 10 meter tower at this site. Like Coburn Road, the wind data is used to determine which source or sources contributed to SO_2 readings at the site.

The YCAPC operates a met sensor at its CO site at Metra-Exposition Drive and 4th Avenue (30-111-0075). The met sensor is on a 7 meter tower next to the monitoring trailer. The site does not meet siting criteria for probe height and it is too close to trees and a sign. The met data is used to review CO data at the site and determine meteorological conditions contributing to high CO readings.

BLAQTC operates three meteorological stations at its three SO_2 sites in Billings and Laurel. These sites are Lockwood Park (30-111-1065), Laurel-BLAQTC (30-111-0016) and Brickyard Lane (30-111-2005). All meteorological equipment is located on 10 meter towers. Analog signals are recorded on chart with the digital signal being stored on magnetic disk. The wind data is used to determine which source or sources contributed to SO_2 readings at the site. The wind data is also being used in connection with a city sponsored SO_2 dispersion modeling study.

2.7.2 AQCR 141 - NORTH CENTRAL MONTANA

AQCR 141, located in north central Montana, is a region of rolling glaciated plains. The Milk, Marias, Teton and Missouri Rivers cut across the region from the west to east in substantial

river valleys that are hundreds of feet lower than the upland bench areas. Relatively small, isolated mountain ranges, the Highwood, Bear Paw and Little Rocky Mountains, rise up from the plains in the eastern half of the region. The western boundary of the region is formed by the Continental Divide and includes most of the area known as the Rocky Mountain Front. The foothills of the Big and Little Belt Mountains form the southern boundary along with the Missouri River. The eastern boundary cuts across the plains north of the Little Rocky Mountains to the Canadian border which is the northern boundary of the region.

With the exception of the isolated mountainous areas most of the region experiences a similar climatological regime with warm dry summers and cold dry winters interrupted by occasional chinooks. Dispersion potential in the region is generally excellent due to persistent and often very strong winds. Temperature inversions in the area, though frequent, are usually shallow and seldom last past noon. The exceptions to this rule are to be found in the mountainous areas and occasionally in the river valleys. During the winter it is possible to have a warm wind blowing along a bench while cold air remains trapped in the bottom of a valley only a few miles away. Persistent inversions have also been noted in the narrow valleys of the Little Rocky Mountains. The wind flow over the region is generally from the west or southwest unless cold northerly winds are sweeping down from the arctic. Precipitation amounts are uniformly low over the entire region.

2.7.2.1 CASCADE COUNTY

Meteorological monitoring in Cascade County consists of one site operated by the Cascade County Health Department (CCHD) at its CO site at Skyway Conoco (30-013-1023) on 10th Avenue South in Great Falls. The met sensors are on a 6 foot tripod on the monitoring trailer. The wind data analog signal is currently recorded on a chart recorder and then digitized and stored on magnetic media. The met data is used to review CO data at the site and determine meteorological conditions contributing to high CO readings. The department has no plans to upgrade the meteorological monitors to a 10 meter tower due to safety concerns.

2.7.3 AQCR 142 - SOUTHWESTERN MONTANA

AQCR 142 is located in the southwestern corner of Montana. The region contains several distinct mountain ranges separated by fairly wide valleys. The valleys run north and south and can be thousands of feet lower than the surrounding mountains. Tributaries for the Missouri, Yellowstone and Clark Fork Rivers have their beginnings in this area.

The mountainous terrain in the region substantially impacts the weather patterns there. Precipitation is often limited to the higher mountains while the valleys remain much drier. Winds along the mountain tops are generally westerly and frequently will not reach down into the north-south running valleys. Inversions are frequent and during the fall and winter can persist for days at a time. Occasional severe inversions can be several thousands of feet deep and very strong allowing almost no dispersion of pollutants. This allows even small emission sources to produce localized areas of poor air quality. Wind speed and direction patterns in this region are highly localized and cannot be adequately characterized by off-site measurements.

2.7.3.1 DEER LODGE COUNTY

Meteorological monitoring in Deer Lodge County currently consists of three sites operated by consultants for the ARCO Coal Company in support of data collection for the Anaconda Superfund site. The three sites are Teressa Ann Terrace (30-023-0010), Zinc Processing (30-023-0011), and Mill Creek (30-023-0706). The Teressa Ann Terrace site is located at the primary PM-10 monitoring site for the Anaconda Group II site. All meteorological sensors are sited according to EPA protocol and are located on 10 meter towers. Data is submitted to the state and updated to AIRS.

2.7.3.2 LEWIS & CLARK COUNTY

Meteorological monitoring in Lewis & Clark County is located at one site operated by the Lewis & Clark County Health Department (LCCHD) in Helena and at four sites operated by Asarco in East Helena. LCCHD's site is at Lincoln School (30-049-0018) in the lower central part of Helena. The met sensors are on a 6 foot tripod on the monitoring trailer. Meteorological data from this site is used in concurrence with PM-10 and nephelometer data to call alerts for the county's wintertime wood stove curtailment program.

Asarco's four sites in East Helena are located at the Firehall (30-049-0714), Old Railroad (30-049-0726), Kennedy Park (30-049-0703) and Zinc Stack (30-049-0721). Meteorological sensors at the zinc stack are located at mid-stack level and at stack top. All other meteorological sites are located at 10 meter towers (except Firehall) and conform to EPA siting criteria. All four meteorological sites have been operated since 12-1-89. Data collected from these sites are being used in connection with the East Helena Lead SIP. The meteorological data will be input to dispersion models to assess impact from the smelter and later to address control strategies.

Digital signals from met sensors are directly written to magnetic storage media. No chart recorders are used with these monitors. The company uses QA procedures which allow for proper data collection.

2.7.4 AQCR 143 - EASTERN MONTANA

AQCR 143 makes up the eastern third of Montana. Rolling glaciated plains cover the northern half of the region while rolling sedimentary plains cover the southern half. The Missouri River cuts from west to east in a deep valley in the glaciated northern half of the region while the Yellowstone River travels to the northeast in a wide but shallower valley through the southern half. The terrain is often quite rough but generally does not produce noticeable terrain effects on the meteorology and climatology of this region.

The weather here is typical of the northern Great Plains with hot dry summers and cold dry winters. Chinooks occur but are not as frequent here as they are in AQCR 141. Precipitation totals are generally light throughout the region with the largest amounts usually coming all at once in a thunderstorm. The wind patterns here can be characterized by existing off-site measurements and are usually westerly. Dispersion potential in this region is excellent as a rule without the strong persistent inversions present in the western part of the state. Inversions can be frequent, especially in the southern part of the region, but are usually shallow and short-lived.

2.7.4.1 ROSEBUD COUNTY

Meteorological monitoring in Rosebud County centers around Montana Power Company's coal-fired power plants in Colstrip. MPC operates five meteorological sites. These are at MPC #1 (30-087-0701), MPC #2 (30-087-0702), MPC #3 (30-087-0700), MPC #4 (30-087-0704) and MPC #14 (30-087-0614). MPC sites #1 through #4 are located adjacent to MPC's SO_2 and NO_2 continuous monitoring sites. The data is used to review meteorological conditions that may cause elevated readings. MPC #14 site is located on a 100 meter tower and wind sensors are recorded at mid-level and at top. This information is used to record upper level winds.

2.7.5 AQCR 144 - NORTHWESTERN MONTANA

AQCR 144 makes up the northwestern corner of Montana and is entirely west of the Continental Divide. The terrain here is uniformly mountainous as is AQCR 142 but the valleys are generally narrower and lower than the valleys of AQCR 142. The

mountain ranges and valleys here also run from the north to the south with the mountaintops thousands of feet higher than the valley floors. The area is drained by the Clark Fork and Kootenai Rivers and includes all of the Flathead and Bitterroot drainages.

The strong Pacific influence and mountainous terrain in the region substantially impact the weather there. Precipitation amounts here are higher than anywhere else in the state and the winters are warmer and wetter as well. Winds along the mountaintops are generally westerly and frequently will not reach down into the north-south running valleys. Inversions are frequent and during the fall and winter can persist for days at a time. Warm Pacific air frequently overrides colder air trapped in the valleys and can produce severe inversions several thousands of feet deep and very strong allowing little pollutant dispersion. This allows even small emission sources to produce localized areas of poor air quality. Dispersion potential in this region is the lowest in the state. Wind speed and direction patterns in this region are highly localized and cannot be adequately characterized by off-site measurements.

2.7.5.1 MISSOULA COUNTY

Meteorological monitoring in Missoula is currently being conducted at the Missoula City-County Health Department's CO site at Malfunction Junction (30-063-0005). The meteorological sensors are on a six foot tripod on top of the sampling shelter. The wind data analog signal is currently recorded on chart recorder and then digitized and stored on magnetic media.

The met data is used to review CO data at the site and determine meteorological conditions contributing to high CO readings. Due to the multiple use conditions of the fairgrounds (where the site is located) and safety reasons, there is no plan to install and guy a 10 meter tower at this site.

2.8 NEPHELOMETERS/BETA GAUGES

2.8.1 AQCR 142 - SOUTHWESTERN MONTANA

2.8.1.1 LEWIS & CLARK COUNTY

Fine particulate data is collected using a nephelometer at the Lewis & Clark County Health Department's site at Lincoln School (30-049-0018). The nephelometer data is correlated with PM-10 data and used as a real time indicator of particulate levels. The county uses the nephelometer to call alerts for their mandatory winter-time wood stove curtailment program.

2.8.1.2 SILVER BOW COUNTY

Fine particulate data is collected using a nephelometer at the Butte-Greeley School site (30-093-0005). The nephelometer is operated by the Butte-Silver Bow Health Department. The nephelometer data is correlated with PM-10 data and used as a real time indicator of particulate levels. The BSBHD uses the nephelometer to call alerts for their mandatory winter-time wood stove curtailment program.

2.8.2 AQCR 144 - NORTHWESTERN MONTANA

2.8.2.1 FLATHEAD COUNTY

Fine particulate data is collected using a nephelometer at the Courthouse East site (30-029-1017) in Kalispell. The nephelometer is operated by the Flathead County Health Department. The nephelometer data is correlated with PM-10 data and used as a real time indicator of particulate levels. At this time nephelometer data is being collected to respond to citizens' concerns on air quality. In the future the nephelometer data may be used to call alerts for a winter-time wood stove curtailment program.

2.8.2.2 LINCOLN COUNTY

Fine particulate data is collected using a nephelometer at the County Courthouse Annex site (30-053-0018) in Libby. The nephelometer is operated by the Lincoln County Health Department. The nephelometer data is correlated with PM-10 data and used as a real time indicator of particulate levels. Lincoln County uses the nephelometer to call alerts for their voluntary winter-time wood stove curtailment program.

2.8.2.3 MISSOULA COUNTY

PM-10 data is collected in Missoula using a beta attenuation monitor (BAM) at the Boyd Park site (30-063-0024). The signal from the BAM at the monitoring site is relayed to the Missoula City-County Health Department's offices through a modem. Missoula personnel use the BAM data and forecast information from the National Weather Service to make predictions for their mandatory winter-time particulate curtailment program.

3.0 NETWORK MODIFICATIONS

As stated in the introduction, the department must conduct a review (1) to determine if the system (monitoring network) meets the monitoring objectives defined in Appendix D of CFR Part 58, and (2) to identify needed modifications of the network, such as the termination or relocation of unnecessary stations or the establishment of new stations that may be necessary.

The department is also required to develop and implement an annual schedule modifying the network in order to eliminate any unnecessary stations or to correct any inadequacies indicated by the results of the annual review. The department must consult with the Regional Administrator of EPA during the development of the schedule to modify the monitoring program. The final schedule and modifications are subject to the approval of the Regional Administrator.

The regional office of the EPA (Region VIII) established a procedure and form to use to document and request modifications to the network. This form is known as the Network Modification Request Form. The state is required to submit this form in advance requesting EPA approval of any proposed network modification.

Network modifications conducted during 1991 are listed in Table 1. These modifications and any recent discussions about the sites (including future considerations) are underlined. Summaries of EPA's responses follow the department's requests. In some cases, the department has filled out network modification request forms to document the location and features of a site. When there have been no requested modifications, EPA has not responded.

4.0 AIR MONITORING EQUIPMENT NEEDS

The department operates various equipment to measure pollutants and meteorological parameters at monitoring sites across Montana. The department also uses shelters, calibrators and various other equipment and devices in support of that monitoring. As the equipment becomes old, it often needs to be upgraded or replaced. When the department adds sites to its network, new equipment must be purchased. Each year the department budgets money to purchase new and replacement equipment.

During the past two fiscal years, the department has purchased several pieces of equipment. These are listed in Tables 3 and 4. In fiscal year 1990, the department spent a total of $54,861 on air monitoring equipment. This included $42,672 for replacement items and $12,189 for new equipment. In fiscal year 1991, the department spent a total of $113,874 on air monitoring equipment. This included $45,348 for replacement items and $68,526 for new equipment.

Table 5 is a list of air monitoring equipment that is currently used at state and county operated sites. The table lists equipment, manufacturer, model, acquisition date, condition and replacement costs at each site. As requested by EPA, an equipment replacement plan is provided on the table. In FY92 the department intends to spend $25,000 for replacement equipment. This will include two shelters and three recorders. In FY93 the department intends to spend another $25,000 for replacement equipment. This will also include two shelters and three recorders. In FY94 the department intends to spend $21,416 for replacement equipment. This will include six meteorological systems, two recorders and one data acquisition system. Depending on funding availability, the department may spend more or less for replacement equipment in the next three fiscal years.

Table 6 provides a partial list of spare equipment that is kept in reserve by the department. Many of the analyzers shown in this table are old and have served their usefulness. Some of the equipment is used for special studies such as the dichotomous samplers and PM-10/CO portable samplers. The department would also like to purchase 15-20 additional PM-10/CO portable samplers to provide adequate coverage for saturation studies. Most of the dichotomous samplers are in poor to fair condition. The department has been able to maintain these samplers in a workable condition.

Several sites have been proposed for establishment in the future. Table 7 lists these sites and equipment needed for them. No specific pieces of equipment are listed for purchase during the next three years. Depending on funding availability, the department may choose to buy some equipment for new sites.

5.0 SUMMARY AND CONCLUSIONS

5.1 EXECUTIVE SUMMARY

Each year the department is required to develop and implement an annual schedule modifying its air monitoring network in order to eliminate any unnecessary stations or to correct any inadequacies indicated by the results of the annual review. The department must consult with the Regional Administrator of EPA during the development of the schedule to modify the monitoring program. The final schedule and modifications are subject to the approval of the Regional Administrator.

During 1991, the department and county agencies operated 26 air monitoring stations. Some of the stations collected multiple parameters. There were 15 PM-10 sites, 4 CO sites, 2 SO_2 sites, 5 TSP/lead sites, 2 TSP sites and 5 meteorological monitoring sites. The department also relies on companies to monitor air quality around their own facilities. Company monitors listed in this report are mostly those required by Prevention of Significant Deterioration (PSD) permits or needed to assess ambient levels in or near federally designated non-attainment areas.

In 1991, the department listed 13 goals or modifications to the network. To date, the department has implemented 7 of these goals. Some proposed new sites were not installed due to funding, equipment and personnel limitations. For 1992, the department has listed 33 goals or modifications to the network. Some of these goals are carryovers from the year before.

5.2 HISTORICAL SUMMARY

The Montana ambient air quality network has undergone many changes from 1986 to 1991. The majority of the changes had to do with particulate monitoring. In the mid 1980s the department had a large network of TSP samplers in the state. These were located in large communities, small communities and near problem areas. On July 31, 1987 the EPA promulgated a new standard for PM-10. Several areas in Montana were designated Group I (greater than 95% probability of exceeding the standard) and Group II (between 20% and 95% probability of exceeding the standard). These designations required the department to do daily sampling in the Group I areas and every other day sampling at the Group II areas. As a consequence, many of the TSP sites were discontinued and PM-10 samplers were moved to allow adequate coverage in the Group I and II areas.

The next biggest change came in the SO_2 monitoring network in the Billings/Laurel area. In early 1987, the department was nearly out of the SO_2 monitoring business in Yellowstone County.

This was mostly due to personnel cutbacks and reprioritization of resources. Due to legislative funding and the creation of the Billings/Laurel Air Quality Technical Committee, renewed emphasis was placed on SO_2 monitoring. At present there are five SO_2 sites in Yellowstone County.

In October 1988, the EPA notified the department that the East Helena lead SIP was inadequate. As a result, the lead monitoring network needed to be expanded in support of the SIP development process. At present there are five lead monitoring stations around East Helena.

For carbon monoxide, the size of the network has stayed the same but adjustments have been made to locate sites in microscale maximum concentration sites. In 1988, the CO site in Billings was moved nearer Main Street (Exposition Drive) to locate it in a microscale location. The CO site in Great Falls was also moved to accommodate the microscale siting requirement. In Missoula the department shut down one of two CO sites: (1) to economize resources and (2) because adequate maximum concentration coverage was provided with the one site. The department is proposing locating CO monitors in Butte and Kalispell. These areas are suspected to have elevated CO levels. The department intends to do saturation studies in these areas and if resources are available, the department will install monitors in these communities.

With each successive network review, the department will continue to refine its network. This document shows (in part) that the department will continue to cooperate with industries and will rely on their resources to conduct monitoring associated with their sources. This is evident in East Helena (SO_2 monitoring), Billings (SO_2 monitoring), Colstrip (PM-10, SO_2 and NO_2 monitoring), Missoula (NO_2 monitoring) and Anaconda (PM-10 monitoring).

5.3 CURRENT AIR MONITORING NETWORK

During 1991, the department and county agencies operated 26 air monitoring stations. Some of the stations collected multiple parameters. There were 15 PM-10 sites, 4 CO sites, 2 SO_2 sites, 5 TSP/lead sites, 2 TSP sites and 5 meteorological monitoring sites. Table 2 provides a "short list" of the current air monitoring stations operated by state and county governments.

There are also several sites on Table 2 that are operated by companies around their facilities. The companies are generally required to operate these sites because of Prevention of Significant Deterioration (PSD) permits or because they are in or near areas designated non-attainment of a National Ambient Air Quality Standard (NAAQS).

5.4 EQUIPMENT STATUS

As mentioned in Section 4.0 AIR MONITORING EQUIPMENT NEEDS, the department operates various equipment to measure pollutants and meteorological parameters at monitoring sites across Montana. During the past two fiscal years, the department has purchased several pieces of equipment. In fiscal year 1990, the department spent a total of $54,861 on air monitoring equipment. This included $42,672 for replacement items and $12,189 for new equipment. In fiscal year 1991, the department spent a total of $113,874 on air monitoring equipment. This included $45,348 for replacement items and $68,526 for new equipment.

During the next three fiscal years the department plans to spend approximately $71,000 to purchase equipment that will be used to replace existing old equipment. Depending on the availability of funding and the priority placed on new sites, the department will purchase equipment for these sites.

The department remains committed to maintaining its network at a high level of dependability. The department is committed to upgrading its system and using the best available equipment to achieve a high level of data quality and data quantity (percent data recovery).

5.5 NETWORK MODIFICATIONS FOR FY91

Table 8 lists the network modifications goals for fiscal year 1991. A status statement is written below each of the goals. Of the thirteen items listed, the department completed seven. The completed items mostly included installation or sampling frequency changes for PM-10 areas. Six items were not completed. TSP monitoring continued in Yellowstone County (for their own purposes) although the department recommends that the sites be discontinued. Three areas were recommended as potential new areas for CO monitoring. The department needs to conduct saturation studies in these areas before potential sites are selected. The department also needs to purchase the necessary equipment and determine if personnel resources are available for these proposed sites.

5.6 NETWORK MODIFICATIONS FOR FY92

Table 9 lists the network modification goals for fiscal year 1992. There are 29 items on this list which details studies, changes or modifications in the network. One major goal is to transfer PM-10 weighings from county laboratories to the state laboratory. County programs have had difficulties establishing weighing rooms that maintain temperature and humidity requirements.

This list contains some of the items not completed in FY91. Carryover items included the discontinuation of TSP sites in Yellowstone County and the establishment of three additional CO sites. The department needs to conduct saturation studies in these communities before potential sites are selected.

As network goals, the department and county agencies are planning to conduct CO saturation studies in Great Falls and Billings. These studies will determine if the current sites are measuring at maximum concentration areas and if any new sites are needed.

The department is also planning on adding a few PM-10 sites to its network. These sites are dependent on equipment availability and personnel resources. Proposed locations include Troy, Ashland, Clancy and Dillon. The department is also proposing changes to its lead monitoring network in East Helena. Proposed changes will be determined after reviewing the results of a dispersion modeling study.

The department plans to upgrade or replace equipment at several of its monitoring stations. These proposed purchases are listed as goals on Table 9. With the installation of new data acquisition systems at two of the nephelometer sites, the department will have completely switched to new data acquisition systems. Additional purchases will be made through the year and equipment will be replaced.

APPENDIX A

Tables for Network Review

LIST OF TABLES

Table	Description
1	MONTANA AMBIENT AIR MONITORING NETWORK - EXISTING AND PROPOSED - WITH LIST OF PARAMETERS AND MODIFICATION NARRATIVE
2	MONTANA AMBIENT AIR MONITORING NETWORK - EXISTING AND PROPOSED - WITH LIST OF PARAMETERS (SHORT LIST)
3	MONTANA EQUIPMENT PURCHASES FOR FY90
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5	MONITORING EQUIPMENT REPLACEMENT PLAN
6	MONITORING NETWORK SPARE EQUIPMENT INVENTORY (PARTIAL LIST)
7	MONITORING EQUIPMENT PURCHASE PLAN FOR NEW SITES
8	MONTANA NETWORK MODIFICATION GOALS FOR FY91
9	MONTANA NETWORK MODIFICATION GOALS FOR FY92

TABLE 1

Montana Ambient Air Monitoring Network

TABLE 1

MONTANA AMBIENT AIR MONITORING NETWORK

AIRS Number	Site Name/Address City/County	Parm	Year of Record	Station Type	Spatial Scale	Monitoring Objective
30-001-XXXX	Industrial Area Dillon/Beaverhead	PM-10	92	SLAMS	Neigh.	H,S

This is new PM-10 site proposed near the industrial area south of Dillon. Depending on resources and equipment availability, the department will attempt to install a PM-10 sampler in this area.

30-013-0009	**Fire Station #1 Great Falls/Cascade**	**PM-10**	**88-91**	**SLAMS**	**Neigh.**	**H,P**

The department requested that a PM-10 monitor be located at this site since it recorded a TSP reading greater than 150 ug/m^3. The department also requested that the sampler be obtained from the Great Falls-Downtown site (Fire Station #1 considered maximum concentration site). Request was made in a letter dated 4-19-88. The department wrote a second letter on 5-19-88 requesting that the proposed sampler would be a Wedding rather than a Sierra-Anderson. The Sierra-Anderson sampler was intended for a site in Thompson Falls. EPA approved this request in a letter dated 12-12-88.

Since 1989, this site has been collocated with another PM-10 sampler. This sampler is collocated for precision and accuracy reporting for the Cascade County Health Department. Since this is the only PM-10 monitor for CCHD's network, the state Air Quality Bureau will assume the responsibility of weighing filters, calculating concentrations and reporting data. CCHD will operate the site on a one-in-six day sampling frequency using two samplers. There are no current plans to deploy the second PM-10 sampler to another location.

30-013-1025	**Skyway Conoco Great Falls/Cascade**	**CO**	**89-91**	**SLAMS**	**Micro.**	**H,P,S**

The department requested that the Pardis Clinic CO monitor be moved to this location in order to locate a permanent microscale CO site (letter and form dated 8-16-89). EPA agreed with this change in a letter dated 11-2-89.

30-023-0010	**Teressa Ann Terrace Anaconda/Deer Lodge**	**PM-10**	**89-91**	**SPM**	**Neigh.**	**H,P**

This site was picked (by EPA) as a potential maximum concentration PM-10 site after an EPA/ESD official reviewed the site location during a visit to the state in June 1988. The department is not aware of any official request; however, the EPA approved the site location in a letter dated 12-12-88. As a formal follow-up, the department submitted a network modification request form documenting this site in a letter dated 6-6-89. EPA again approved the site in a letter dated 9-6-89. This time, however, the EPA had some concerns that the site may not represent the area of maximum concentration. The department wrote back on 10-12-89 with concern that EPA had already blessed the site and appeared to be back-pedaling. The department also asked for procedures to use to determine maximum concentration sites. EPA wrote back on 11-2-89 with suggested procedures. EPA staff intends to review the data to determine if the site is representative of a maximum concentration site (9-6-89 letter).

This site is operated by the ARCO Coal Company as part of their network around the Anaconda Superfund sites. The department receives this data and updates it to AIRS. This site also serve monitoring requirements for the Anaconda PM-10 Group II area.

<u>PM-10 at this site no longer needs to be sampled using an every other day schedule. For the levels recorded at this site, a sampling schedule of one-in-six is adequate for the PM-10 Group II area. The department needs to discuss this with Superfund staff and decide on sampling frequency.</u>

30-029-0003 **Col. Falls Jr. High** **PM-10** **85-91** **SLAMS** **Neigh.** **H,P**
Columbia Falls/
Flathead

TSP was discontinued at this site in September 1987 following the promulgation of the NAAQS for PM-10 on 7-31-87. PM-10 monitoring is being done at this site.

The department request that the PM-10 monitor be discontinued at the Libby-Kendall Field site since special purpose monitoring had been discontinued. Sampler was moved to the Columbia Falls Junior High site to allow us to go to daily sampling (letter dated 3-3-88). EPA never responded to this request.

A network modification request form documenting this site was sent to EPA on 1-18-91. Since this was a documentation of an existing site and no proposed change, EPA did not respond.

30-029-1015 **Universal Athletics** **PM-10** **85-91** **SLAMS** **Neigh.** **H,P**
Kalispell/Flathead

TSP was discontinued at this site in September 1987 following the promulgation of the NAAQS for PM-10 on 7-31-87. PM-10 monitoring was also being done at this site.

A network modification request form documenting this site was sent to EPA on 1-18-91. Since this was a documentation of an existing site and no proposed change, EPA did not respond.

30-029-0039 **Marcus Foods** **PM-10** **91** **SLAMS** **Neigh.** **H,P**
Whitefish/Flathead

This is a new PM-10 site and was installed in 1991. Start date was April 30, 1991. This site was located in the central business district in Whitefish. The department decided to install this site due to public concern and Whitefish's proximity to other PM-10 Group I areas at Kalispell and Columbia Falls. Network modification request forms will be sent to EPA for their approval.

30-029-XXXX	Idaho and Main St. Kalispell/Flathead	CO	92	SLAMS	Micro.	H,P

This is a new CO site being planned for the busy intersection of U.S Highway 93 and U.S. Highway 2 (Idaho Ave. & Main St.) in Kalispell. Exact location will be determined. Network modification request forms will be sent to EPA for their approval. The probability of this site is dependent upon resources and equipment availability.

30-031-0002	**East Main City Bldg. Bozeman/Gallatin**	**PM-10**	**85-91**	**SLAMS**	**Neigh.**	**H,P**

TSP was discontinued at this site in September 1987 following the promulgation of the NAAQS for PM-10 on 7-31-87. PM-10 monitoring is being done at this site.

The department installed a second PM-10 sampler at this site on January 11, 1991. This will allow us to increase sampling frequency from one-in-six days to every other day during the first and fourth quarters. Due to high TSP readings measured by the city of Bozeman and the need to obtain additional data in this fairly large Montana city, the department feels that increased sampling frequency was warranted. Network modification request forms will be sent to EPA for their approval.

30-031-0008	**Belgrade ConAgra Belgrade/Gallatin**	**PM-10**	**91**	**SLAMS**	**Neigh.**	**H,P**

This is a new PM-10 site that was installed in an open field behind the Belgrade ConAgra elevators near residential areas. The first sample was taken on 10-9-91. Network modification request forms will be sent to EPA for their approval.

30-043-0903	**Microwave Montana City/Jefferson**	**TSP**	**89-91**	**SLAMS**	**Neigh.**	**B,S**
		Pb	**89-91**	**SLAMS**	**Neigh.**	**B,S**
		SO_2	**74-91**	**SPM**	**Neigh.**	**S**

This is a fairly old site where the state and ASARCO measured TSP, Pb, and SO_2 over the years. After an absence, TSP and Pb were started up again on 11-6-89. The sampling frequency was initially every 1-in-6 days. On 7-1-90, the sampling frequency changed again to daily for a special source apportionment study until 3-31-91 when it went back to one-in-six. The department formally documented this site using the network modification request forms (letter and forms dated 6-27-90).

EPA approved this site as a SLAMS site in an undated letter (received 1-14-91).

This site was operated as a background site for lead for the East Helena lead SIP. Since data needs have been met and concentrations are low, the department decided to terminate TSP and Pb at this site on 7-1-91. Network modification request forms were sent to EPA for their approval on 5-31-91.

EPA responded in a letter dated August 14, 1991. They agreed to allow the department to shut down Microwave TSP and Pb.

30-043-0908	**Ash Grove Siding Montana City/Jefferson**	**SO_2**	**89-91**	**SPM**	**Neigh.**	**S**

This site is operated by ASARCO and is part of their network around their primary lead smelter. The department formally documented this site using the network modification request forms (letter and forms dated 6-27-90).

EPA approved this site as a SLAMS equivalent special purpose monitor (SPM). in an undated letter (received 1-14-91). The approval mentioned the need for a network review of Asarco's SO_2 network to meet the needs of the SIP, the need for a quality assurance plan and a need for the state to review the maintenance of the monitors and probes.

30-043-XXXX	Clancy Area Clancy/Jefferson	PM-10	92	SLAMS	Neigh.	H,P

This is a new PM-10 site proposed for the north part of Jefferson County. There are several paved and unpaved roads in the area as well as residential wood combustion.

30-049-0001	**Cogswell Building Helena/Lewis & Clark**	**PM-10**	**85-91**	**SLAMS**	**Neigh.**	**P**

TSP was discontinued at this site in September 1987 following the promulgation of the NAAQS for PM-10 on 7-31-87. PM-10 monitoring was also being done at this site.

The department requested that the collocated PM-10 monitor located at this site be moved to the Butte-Greeley School site because it has higher readings (letter dated 10-11-89). EPA approved this move in a letter dated 11-17-89.

The department made a request to EPA on 11-14-90 to reduce the sampling frequency from every other day to once every six days starting 10-1-90. The concentrations observed at this site warrant this change in sampling frequency. The EPA approved this request in a letter dated 12-3-90.

30-049-0018	**Lincoln School Helena/Lewis & Clark**	**PM-10**	**91**	**SLAMS**	**Neigh.**	**H,P**

This is an existing site that has been operated by the Lewis & Clark County Health Department during their winter-time wood stove curtailment program. It was operated as an SPM and was used to help call the county alerts. By relying more on the nephelometer, the county will operate this sampler on a midnight-to-midnight basis and submit the filters to the state. Starting October 1, 1991 this site will be considered SLAMS.

30-049-0701	**Kleffner Road East Helena/Lewis & Clark**	**SO_2**	**74-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by ASARCO and is part of their network around their primary lead smelter. The department formally documented this site using the network modification request forms (letter and forms dated 6-27-90).

EPA approved this site as a SLAMS equivalent special purpose monitor (SPM). in an undated letter (received 1-14-91). The approval mentioned the need for a network review of Asarco's SO_2 network to meet the needs of the SIP, the need for a quality assurance plan and a need for the state to review the maintenance of the monitors and probes.

30-049-0702	**Water Tank East Helena/Lewis & Clark**	**SO_2**	**74-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by ASARCO and is part of their network around their primary lead smelter. The department formally documented this site using the network modification request forms (letter and forms dated 6-27-90).

EPA approved this site as a SLAMS equivalent special purpose monitor (SPM). in an undated letter (received 1-14-91). The approval mentioned the need for a network review of Asarco's SO_2 network to meet the needs of the SIP, the need for a quality assurance plan and a need for the state to review the maintenance of the monitors and probes.

30-049-0703	**Kennedy Park East Helena/Lewis & Clark**	**SO_2**	**74-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by ASARCO and is part of their network around their primary lead smelter. The department formally documented this site using the network modification request forms (letter and forms dated 6-27-90).

EPA approved this site as a SLAMS equivalent special purpose monitor (SPM). in an undated letter (received 1-14-91). The approval mentioned the need for a network review of Asarco's SO_2 network to meet the needs of the SIP,

the need for a quality assurance plan and a need for the state to review the maintenance of the monitors and probes.

30-049-0711	**East Station East Helena/Lewis & Clark**	**SO_2**	**74-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by ASARCO and is part of their network around their primary lead smelter. The department formally documented this site using the network modification request forms (letter and forms dated 6-27-90).

EPA approved this site as a SLAMS equivalent special purpose monitor (SPM). in an undated letter (received 1-14-91). The approval mentioned the need for a network review of Asarco's SO_2 network to meet the needs of the SIP, the need for a quality assurance plan and a need for the state to review the maintenance of the monitors and probes.

30-049-0714	**Firehall East Helena/Lewis & Clark**	**TSP**	**81-91**	**SLAMS**	**Neigh.**	**H,P,S**
		Pb	**81-91**	**SLAMS**	**Micro.**	**H,P,S**

The department requested that the sampling frequency be changed from one-in-three days to one-in-six days in a letter dated 6-7-89. The EPA approved this request on 7-17-89. On 7-1-90, the sampling frequency changed again to daily for a special source apportionment study until 3-31-91 when it will go to every other day.

The department request using quartz filters at this site so they could be analyzed using XRF for the continuance of a CMB study under the East Helena lead SIP (letter dated 8-9-90). EPA initially nixed the request in a letter dated 8-30-89. A second request for use of quartz filters was made by the department on 11-14-89. This time EPA approved the request in letters dated 12-27-89 and 1-3-90. Use of these filters were limited to the length of the CMB study.

In a letter to EPA dated 5-31-91, the department requested the following: (1) Reduce frequency to every other day starting 4-1-91, (2) change back to

fiberglass filters starting 7-1-91, and (3) relocate the collocated sampler from Hadfield to Firehall starting 7-1-91.

EPA responded in a letter dated August 14, 1991. They agreed with all of our requests for this site however the relocation of the Hadfield collocated sampler depended on the termination of that site. They did not agree with that request. Consequently, the department will not move the collocated sampler to Firehall.

30-049-0719	**Hadfield East Helena/Lewis & Clark**	**TSP**	**81-91**	**SLAMS**	**Neigh.**	**H,P,S**
		Pb	**81-91**	**SLAMS**	**Micro.**	**H,P,S**
		PM-10	**88-91**	**SLAMS**	**Neigh.**	**H,P**

The department requested that the sampling frequency be changed for the TSP/Pb sampler from one-in-three days to one-in-six days in a letter dated 6-7-89. The EPA approved this request on 7-17-89.

The department request using quartz filters at this site so they could be analyzed using XRF for the continuance of a CMB study under the East Helena lead SIP (letter dated 8-9-90). EPA initially nixed the request in a letter dated 8-30-89. A second request for use of quartz filters was made by the department on 11-14-89. This time EPA approved the request in letters dated 12-27-89 and 1-3-90. Use of these filters were limited to the length of the CMB study.

East Helena was considered part of the Helena PM-10 Group II area. After the PM-10 standard was promulgated, TSP samplers were run as surrogates at this location. In April 1988, the site recorded a TSP reading greater than 150 ug/m^3. This event triggered the department into installing a PM-10 sampler. The actual samplers were purchased by industry but data is analyzed and reported by the state.

In a letter to EPA dated 5-31-91, the department requested the following: (1) Shutdown the TSP/Pb samplers on 7-1-91, (2) relocate the collocated sampler from this site to Firehall starting 7-1-91, (3) keep the PM-10

sampler at its present location and (4) discontinue lead analyses on PM-10 filters.

EPA responded in a letter dated August 14, 1991. They disagreed with our request to shut down the Hadfield TSP/Pb sampler. They wanted us to operate the sampler on a one-in-six day schedule. They allowed us to discontinue the lead analyzes on PM-10 filters. They agreed to allow us move the collocated sampler to Firehall but the department will not do this since the TSP/Pb monitors are not being terminated. EPA cited a SIP provision in a 1984 Federal Register notice that committed the state to continue TSP/Pb sampling at this site indefinitely.

30-049-0724	**Dartman Field East Helena/Lewis & Clark**	**TSP**	**83-91**	**SLAMS**	**Neigh.**	**H,S**
		Pb	**83-91**	**SLAMS**	**Neigh.**	**H,S**

This site has been operated as a TSP/Pb site since 1983. This site was moved about 125 yards to the east on 6-28-90 to be located near ASARCO's Kennedy Park meteorological monitor. This change was verbally communicated to EPA and received approval prior to the move. The department formally documented this move and the site using the network modification request forms (letter and forms dated 6-27-90). As of September 1990, EPA has not responded to the documentation.

The department operated a PM-10 at this site from 1987 until 1989. Lead analyses were conducted on the PM-10 filters and compared with the lead on the TSP filters. The PM-10 concentrations were very low and the sampler was needed in Columbia Falls so that daily sampling could be conducted at that site. PM-10 sampling was being done at another site in East Helena. Consequently, PM-10 was discontinued at this site on 10-2-89. EPA was not formally notified of this change.

In a letter to EPA dated 5-31-91, the department requested the following: (1) Reduce frequency to one-in-six days starting 4-1-91 and (2) shutdown the TSP/Pb samplers on 7-1-91.

EPA responded in a letter dated August 14, 1991. They agreed with our

request to reduce the frequency to once every sixth day but disagreed with our request to shut down the site.

30-049-0726	**Old Railroad East Helena/Lewis & Clark**	**TSP**	**89-91**	**SLAMS**	**Neigh.**	**H,S**
		Pb	**89-91**	**SLAMS**	**Neigh.**	**H,S**

This is a new site located to the east of the Asarco smelter. The TSP and Pb were started up on 11-6-89. The sampling frequency was initially every 1-in-6 days. On 7-1-90, the sampling frequency changed again to daily for a special source apportionment study until 3-31-91 when it will go back to every other day. The department formally documented this site using the network modification request forms (letter and forms dated 6-27-90).

EPA approved this site as a SLAMS site in an undated letter (received 1-14-91).

In a letter to EPA dated 5-31-91, the department requested the following: (1) Reduce frequency to every other day starting 4-1-91 and (2) move the sampler to a new maximum concentration site as determined by dispersion modeling.

EPA responded in a letter dated August 14, 1991. They agreed with our request to reduce the frequency to every other day. They also agreed with our request to move the site to a maximum concentration site as determined by dispersion modeling. Another network modification request form will need to be submitted detailing this request.

30-049-1002	Hastie Residence East Helena/Lewis & Clark	TSP	74-85	SLAMS	Neigh.	H,S
		Pb	77-85	SLAMS	Neigh.	H,S

This site had been a long-term TSP and Pb site in East Helena from the mid-

1970s until 1985. East Helena was designated non-attainment based partially on values recorded at this site. Since the site recorded lower lead quarterly averages than Firehall and Hadfield and the site was being overgrown by trees, the department discontinued the site in 1985.

In response to the department's May 31, 1991 letter, EPA 's wrote back on August 14, 1991 and wanted the department to activate another site in the area of the old Hastie site (30-049-1002). A SIP provision required the state to run Hadfield, Dartman Field, Firehall and Hastie. The department responded in a letter dated September 9, 1991 and wanted to review modeling before establishing another site in the Hastie area.

30-053-0012 Lincoln Co. Courthouse PM-10 85-91 SLAMS Neigh. H,P Libby/Lincoln

TSP was discontinued at this site in September 1987 following the promulgation of the NAAQS for PM-10 on 7-31-87. PM-10 monitoring was also being done at this site.

Due to the high 24-hour readings at this site and a ratio of the maximum concentration to the standard greater than 1.4, this site qualifies to have a sampling frequency of only once every six days. The department intends to maintain current sampling frequency (every day) through this winter. However, starting 4-1-92, the department will reduce sampling frequency to every sixth day in the second and third quarters and every other day in the first and fourth quarters. The department will formally notify EPA of this request using network modification request forms.

By reducing the sampling frequency, this will provide the department with one extra PM-10 sampler. The department intends to locate this sampler in the community of Troy which is about 20 miles west of Libby.

A network modification request form documenting this site was sent to EPA on 1-18-91. Since this was a documentation of an existing site and no proposed change, EPA did not respond.

30-053-0019	Troy School Troy/Lincoln	PM-10	91	SLAMS	Neigh.	H,P

This is a new PM-10 site that was installed at the Troy School in September, 1991. The site will operate every other day during the first and fourth quarters and once every six days during the other quarters. A network modification request form will be sent to EPA for their approval.

30-053-1005	**Lincoln Electric Co-op Eureka/Lincoln**	**PM-10**	**87-91**	**SLAMS**	**Neigh.**	**H,P**

TSP monitoring was discontinued at this site in October 1987. This area had been designated as a Group II PM-10 area which required that the site be switched to PM-10 samplers.

PM-10 sampling was started in October 1987 because the area was designated Group II for PM-10.

In FY92, the department intends to investigate alternative locations for the PM-10 site in Eureka. There has been some concern by the public and department personnel that we are not necessarily monitoring in the maximum concentration site. Depending on the department's investigation, we may propose to relocate this site.

30-063-0005	**Malfunction Junction Missoula/Missoula**	**CO**	**79-91**	**SLAMS**	**Micro.**	**H,P,S**

The department and the Missoula City-County Health Department requested that this site be discontinued during the five summer months from April 1 through August 30 due to a concern about resources and the lack of elevated CO readings during this period (letter and attached form dated 4-6-90). EPA approved this request in a letter dated 6-29-90 for the specified period in 1990 but not necessarily for other years. Comments were made concerning relocation of the CO probe and need for eight consecutive quarters of data for attainment/maintenance demonstrations.

In letter and forms dated 5-16-91, the department requested that the Malfunction site be seasonally shutdown from May 1, 1991 to August 31, 1991. The department anticipates that an oxygenated fuel program will be

part of the CO SIP for Missoula. At the time the oxygenated fuel program is in effect, the department will have to conduct continuous monitoring to show eight quarters of compliance data.

EPA responded to this request in a letter dated August 8, 1991. They approved this request but noted that eight consecutive quarters of data without a violation must be presented to show attainment. Use of seasonal data to show attainment is not acceptable.

30-063-0016	**Stone #2**	**TSP**	**77-91**	**SPM**	**Neigh.**	**S**
	Missoula/Missoula					

This site is operated by Missoula county for the Stone Container Corporation. It is used as a surrogate PM-10 sampler.

The department requested that Stone Container replace or upgrade the existing TSP monitors to PM-10s. Hopefully, this should be completed in early 1992.

30-063-0024	**Boyd Park**	**PM-10**	**84-91**	**SLAMS**	**Neigh.**	**H,P**
	Missoula/Missoula					
		CO	**81-91**	**SLAMS**	**Neigh.**	**P**

TSP was discontinued at this site in September 1987 following the promulgation of the NAAQS for PM-10 on 7-31-87. PM-10 monitoring was also being done at this site.

A network modification request form documenting this site was sent to EPA on 1-18-91. Since this was a documentation of an existing site and no proposed change, EPA did not respond.

In letter and forms dated 5-16-91, the department requested that the Boyd Park CO site be permanently shutdown starting April 1, 1991. This site has seen no exceedances of the CO standard in the last three years and is located approximately four blocks south of the Malfunction Junction site.

EPA responded to this request in a letter dated August 8, 1991. They disapproved the request to permanently shut down the site. They noted the

need for additional justification. They wanted to know that 1) Malfunction Junction is the CO maximum concentration location and 2) that there is no need for a second CO monitoring site in Missoula (i.e., that the Malfunction Junction site can adequately address all contributing sources whether they are mobile, point or area).

The department wrote back on September 16, 1991 and stated that we do not plan to restart the Boyd Park site this fall (1991). A review accompanied the letter and showed that the maximum 8-hour concentrations at Malfunction Junction are greater than Boyd Park for all but one quarter since 1986.

30-063-0031	**Health Dept. Roof Missoula/Missoula**	**PM-10**	**86-91**	**SLAMS**	**Neigh.**	**H,P**

TSP was discontinued at this site in September 1987 following the promulgation of the NAAQS for PM-10 on 7-31-87. PM-10 monitoring was also being done at this site.

PM-10 sampling was initiated in September 1986. This site is in the downtown central business districts and is considered a maximum concentration site for this part of Missoula.

A network modification request form documenting this site was sent to EPA on 1-18-91. Since this was a documentation of an existing site and no proposed change, EPA did not respond.

30-063-0034	**Stone #1A Missoula/Missoula**	**TSP**	**87-91**	**SPM**	**Neigh.**	**S**
		NO_2	**88-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by Missoula county for the Stone Container Corporation. It is used as a surrogate PM-10 sampler. The TSP sampler was moved to this site from the Stone #1 site because it was in more of a direct line downwind of the facility.

This parameter is being monitored by the Stone Container Corporation as a condition for a permit to burn petroleum coke in their lime kilns.

The department requested that Stone Container replace or upgrade the existing TSP monitors to PM-10s. Hopefully, this should be completed in early 1992.

30-087-0700	**MPC #3 Colstrip/Rosebud**	**SO_2**	**82-91**	**SPM**	**Neigh.**	**H,P**
		NO_2	**82-91**	**SPM**	**Neigh.**	**H,S**
		PM-10	**89-91**	**SPM**	**Neigh.**	**H,P**

This site is operated by the Montana Power Company and is part of their network around their coal-fired power plants. The PM-10 sampler was installed in December 1989. This site is intended to monitor for PM-10 in Colstrip TSP secondary non-attainment area.

30-087-0701	**MPC #1 Colstrip/Rosebud**	**TSP**	**72-91**	**SPM**	**Neigh.**	**H,S**
		SO_2	**81-91**	**SPM**	**Neigh.**	**H,S**
		NO_2	**81-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by the Montana Power Company and is part of their network around their coal-fired power plants.

30-087-0702	**MPC #2 Colstrip/Rosebud**	**TSP**	**72-91**	**SPM**	**Neigh.**	**H,S**
		SO_2	**81-91**	**SPM**	**Neigh.**	**H,S**
		NO_2	**81-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by the Montana Power Company and is part of their network around their coal-fired power plants.

30-087-0704	**MPC #4 Colstrip/Rosebud**	**TSP**	**77-91**	**SPM**	**Neigh.**	**H,S**
		SO_2	**77-91**	**SPM**	**Neigh.**	**H,S**
		NO_2	**77-91**	**SPM**	**Neigh.**	**H,S**

This site is operated by the Montana Power Company and is part of their network around their coal-fired power plants.

30-087-XXXX	Ashland Area Ashland/Rosebud	PM-10	92	SLAMS	Neigh.	H,P

This is a new PM-10 site proposed for the town of Ashland. This is a small town on the edge of the Northern Cheyenne Indian Reservation. Sources in this town include a small sawmill, paved and unpaved roads and residential wood combustion.

30-089-0003	**Sanders Co. Courthouse Thompson Falls/Sanders**	**PM-10**	**85-91**	**SLAMS**	**Neigh.**	**H,P**

The department requested that a Sierra-Anderson PM-10 sampler from Great Falls be moved to this site in order to increase sampling frequency (letter dated 5-19-88). EPA approved this move in a letter dated 12-12-88.

A network modification request form documenting this site was sent to EPA on 1-18-91. Since this was a documentation of an existing site and no proposed change, EPA did not respond.

30-093-0005	**Greeley School Butte/Silver Bow**	**PM-10**	**85-91**	**SLAMS**	**Neigh.**	**H,P,S**

The department requested that the PM-10 samplers be moved from the top of the school building to the top of a sampling shelter to lower the probe height (letter dated 3-22-88). EPA approved the resiting in a letter dated 12-12-88. To formalize the request the department submitted a network modification request form for this change on 8-10-89. EPA again approved this change in a letter dated 11-2-89.

The department requested that the collocated PM-10 monitor located at the Helena-Cogswell Building be moved to the Butte-Greeley School site because it has higher PM-10 readings (letter dated 10-11-89). EPA approved this move in a letter dated 11-17-89.

30-093-0008	**Butte - Greenhouse Butte/Silver Bow**	**PM-10**	**91**	**SLAMS**	**Neigh.**	**H,P**

This is a new PM-10 site that was installed in the maximum emission grid in the Butte PM-10 Group I area. The first sample was taken on 1-5-91. The additional site was needed to show attainment and maintenance of the PM-10 standard in this part of Butte. A letter and a network modification request form was sent to EPA on 1-18-91. EPA approved this site in a letter dated 2-13-91. The samplers will operate every other day during the first and fourth quarters and every sixth day during the second and third quarters.

30-093-XXXX	Harrison & Int. 90 Butte/Silver Bow	CO	92	SLAMS	Micro.	H,P

This is a new CO site being planned for the busy intersection of Interstate 90 and Harrison Avenue in Butte. Exact location will be determined. Network modification request forms will be sent to EPA for their approval. The probability of this site is dependent upon resources and equipment availability.

30-111-0008	**City Hall Billings/Yellowstone**	**TSP**	**71-91**	**SLAMS**	**Neigh.**	**H,P**

This is a surrogate PM-10 sampler operated by the Yellowstone County APC.

The department recommends that this site be shutdown by December 31, 1991. The YCAPC's PM-10 sampler is located about three blocks east and is considered in the maximum concentration site for the areas. Formal network modification request forms will be sent to the EPA requesting approval for this change.

30-111-0016	**BLAQTC - Laurel Laurel/Yellowstone**	**SO_2**	**87-91**	**SPM**	**Neigh.**	**H,S**

This is a BLAQTC (industrial) operated site and has been operated by the companies since 12-87. The department formally documented the site using the network modification request forms (letter and forms dated 1-5-90). EPA approved the site on 5-14-90 as a SLAMS equivalent special purpose monitor (SPM).

30-111-0066	**Coburn Road Billings/Yellowstone**	**SO_2**	**81-91**	**SLAMS**	**Neigh.**	**H,S**

This is a state operated site and has continually operated since 1981. The department formally documented the site using the network modification request forms (letter and forms dated 1-5-90). EPA approved the site on 5-14-90 as a SLAMS. EPA was concerned about the height of the meteorological monitors particularly if they were to be used for SIP purposes.

The department upgraded the meteorological sensor on 11-14-90. This involved erecting a 10 meter tower across the fence and away from the sampling trailer.

30-111-0075	**Metra - 4th & Expo Billings/Yellowstone**	**CO**	**88-91**	**SLAMS**	**Micro.**	**H**

This was the second microscale CO site that was located along Main Street (Exposition Drive). The approval process for this site was a fairly lengthy procedure since EPA was concurrently developing internal network approval procedures with their agency. The department submitted information in support of this site but EPA's network modification request form had not been developed at this time. The EPA approved this site in their 12-12-88 letter. The approval was condition on the need for the department to conduct a CO grab sampling study in Billings. The intent of the study was to determine if this site would be considered the maximum concentration site and coupled with the need to show attainment/maintenance of the CO NAAQS at all locations in Billings.

The YCAPC and state intends to conduct a CO saturation study during December 1991. This study is somewhat a repeat of the CO saturation study

conducted during March of 1990. This saturation study will allow the department to determine "hot spots" during times of poor ventilation and peak CO levels in Billings. After review of this information, the department will determine if and where a second permanent CO site should be located.

30-111-0076 Ponderosa School SO_2 89-91 SLAMS Neigh. P
Billings/Yellowstone

This has been a state operated site since 10-6-89. The purpose of this site is to measure SO_2 in a populated area. The department formally documented the site using the network modification request forms (letter and forms dated 1-5-90). EPA approved the site on 5-14-90 as a SLAMS. EPA was concerned about the height of the meteorological monitors particularly if they were to be used for SIP purposes.

The department will continue to operate this population-oriented site for at least one more year. Depending on the outcome of two dispersion modeling studies (one in support of a permit application for a PSD co-generation facility and another by the city of Billings), the department will review this information with regard to future SO_2 siting possibilities.

30-111-0077 Federal Credit Union PM-10 89-91 SLAMS Micro. H,P
Billings/Yellowstone

This PM-10 sampler was installed in November 1989. This site is intended to monitor for PM-10 in Billings TSP secondary non-attainment area.

YCAPC to continue to operate this site with the collocated sampler on a one-in-six day schedule until December 31, 1991. Since the YCAPC does not have an adequate laboratory to weigh PM-10 filters, the department will assume the responsibility of weighing filters, calculating concentrations and reporting data. This will start at the beginning of the fourth quarter. Starting on January 1, 1992, YCAPC will operate the PM-10 site on a one-in-three days sampling schedule.

30-111-1001	**Laurel Jr. High Sch. Billings/Yellowstone**	**TSP**	**71-91**	**SLAMS**	**Neigh.**	**P**

This TSP hi-vol is operated as a surrogate PM-10 sampler by the Yellowstone County APC.

The department recommends that this site be shutdown by December 31, 1991. Concentrations at this site have measured low over its years of operation. There is no need to keep this site at its present location. Formal network modification request forms will be sent to the EPA requesting approval for this change.

30-111-XXXX	24th St. W & Central Billings/Yellowstone	CO	92	SLAMS	Micro.	H,P

This is a new CO site being planned for the west end of Billings. Exact location will be determined. Network modification request forms will be sent to EPA for their approval. The probability of this site is dependent upon resources and equipment availability.

30-111-1065	**BLAQTC - Lockwood Park Billings/Yellowstone**	**SO_2**	**87-91**	**SPM**	**Neigh.**	**H,P,S**

This is a BLAQTC (industrial) operated site and has been operated by the companies since 12-87. This site is located in the same area as the department's old Lockwood Park site (30-111-0065); that site operated from 1981 until 1-87. The department formally documented the site using the network modification request forms (letter and forms dated 1-5-90). EPA approved the site on 5-14-90 as a SLAMS equivalent special purpose monitor (SPM).

30-111-2005	**BLAQTC - Brickyard Lane Billings/Yellowstone**	**SO_2**	**89-91**	**SPM**	**Neigh.**	**H,P,S**

This is a BLAQTC (industrial) operated site and has been operated by the companies since 11-8-89. The department formally documented the site using the network modification request forms (letter and forms dated 1-5-90). EPA approved the site on 5-14-90 as a SLAMS equivalent special purpose monitor (SPM).

TABLE 2

Montana Ambient Air Monitoring Network (Short List)

TABLE 2

MONTANA AMBIENT AIR MONITORING NETWORK (SHORT LIST)

AIRS Number	Site Name/Address City/County	Parm	Year of Record	Station Type	Spatial Scale	Monitoring Objective
30-001-XXXX Proposed Site	Industrial Area Dillon/Beaverhead	PM-10	92	SLAMS	Neigh.	H,S
30-013-0009	Fire Station #1 Great Falls/Cascade	PM-10	88-91	SLAMS	Neigh.	H,P
30-013-1025	Skyway Conoco Great Falls/Cascade	CO	89-91	SLAMS	Micro.	H,P,S
30-023-0010 Company Site	Teressa Ann Terrace Anaconda/Deer Lodge	PM-10	89-91	SPM	Neigh.	H,P
30-029-0003	Col. Falls Jr. High Columbia Falls/ Flathead	PM-10	85-91	SLAMS	Neigh.	H,P
30-029-1015	Universal Athletics Kalispell/Flathead	PM-10	85-91	SLAMS	Neigh.	H,P
30-029-0039	Marcus Foods Whitefish/Flathead	PM-10	91	SLAMS	Neigh.	H,P
30-029-XXXX Proposed Site	Idaho and Main St. Kalispell/Flathead	CO	92	SLAMS	Micro.	H,P
30-031-0002	East Main City Bldg. Bozeman/Gallatin	PM-10	85-91	SLAMS	Neigh.	H,P
30-031-0008	Belgrade ConAgra Belgrade/Gallatin	PM-10	91	SLAMS	Neigh.	H,P

30-043-0903	Microwave Montana City/Jefferson	TSP	89-91	SLAMS	Neigh.	B,S
		Pb	89-91	SLAMS	Neigh.	B,S
Company Site	(SO_2 only)	SO_2	74-91	SPM	Neigh.	S
30-043-0908 Company Site	Ash Grove Siding Montana City/Jefferson	SO_2	89-91	SPM	Neigh.	S
30-043-XXXX Proposed Site	Clancy Area Clancy/Jefferson	PM-10	92	SLAMS	Neigh.	H,P
30-049-0001	Cogswell Building Helena/Lewis & Clark	PM-10	85-91	SLAMS	Neigh.	P
30-049-0018	Lincoln School Helena/Lewis & Clark	PM-10	91	SLAMS	Neigh.	H,P
30-049-0701 Company Site	Kleffner Road East Helena/Lewis & Clark	SO_2	74-91	SPM	Neigh.	H,S
30-049-0702 Company Site	Water Tank East Helena/Lewis & Clark	SO_2	74-91	SPM	Neigh.	H,S
30-049-0703 Company Site	Kennedy Park East Helena/Lewis & Clark	SO_2	74-91	SPM	Neigh.	H,S
30-049-0711 Company Site	East Station East Helena/Lewis & Clark	SO_2	74-91	SPM	Neigh.	H,S

30-049-0714	Firehall East Helena/Lewis & Clark	TSP	81-91	SLAMS	Neigh.	H,P,S
		Pb	81-91	SLAMS	Micro.	H,P,S
30-049-0719	Hadfield East Helena/Lewis & Clark	TSP	81-91	SLAMS	Neigh.	H,P,S
		Pb	81-91	SLAMS	Micro.	H,P,S
		PM-10	88-91	SLAMS	Neigh.	H,P
30-049-0724	Dartman Field East Helena/Lewis & Clark	TSP	83-91	SLAMS	Neigh.	H,S
		Pb	83-91	SLAMS	Neigh.	H,S
30-049-0726	Old Railroad East Helena/Lewis & Clark	TSP	89-91	SLAMS	Neigh.	H,S
		Pb	89-91	SLAMS	Neigh.	H,S
30-049-1002 Proposed Site near existing old location.	Hastie Residence East Helena/Lewis & Clark	TSP	74-85	SLAMS	Neigh.	H,S
		Pb	77-85	SLAMS	Neigh.	H,S
30-053-0012	Lincoln Co. Courthouse Libby/Lincoln	PM-10	85-91	SLAMS	Neigh.	H,P
30-053-0019 Proposed Site	Troy School Troy/Lincoln	PM-10	91	SLAMS	Neigh.	H,P

30-053-1005	Lincoln Electric Co-op Eureka/Lincoln	PM-10	87-91	SLAMS	Neigh.	H,P
30-063-0005	Malfunction Junction Missoula/Missoula	CO	79-91	SLAMS	Micro.	H,P,S
30-063-0016 Company Site	Stone #2 Missoula/Missoula	TSP	77-91	SPM	Neigh.	S
30-063-0024	Boyd Park Missoula/Missoula	PM-10	84-91	SLAMS	Neigh.	H,P
		CO	81-91	SLAMS	Neigh.	P
30-063-0031	Health Dept. Roof Missoula/Missoula	PM-10	86-91	SLAMS	Neigh.	H,P
30-063-0034 Company Site	Stone #1A Missoula/Missoula	TSP	87-91	SPM	Neigh.	S
		NO_2	88-91	SPM	Neigh.	H,S
30-087-0700 Company Site	MPC #3 Colstrip/Rosebud	SO_2	82-91	SPM	Neigh.	H,P
		NO_2	82-91	SPM	Neigh.	H,S
		PM-10	89-91	SPM	Neigh.	H,P
30-087-0701 Company Site	MPC #1 Colstrip/Rosebud	TSP	72-91	SPM	Neigh.	H,S
		SO_2	81-91	SPM	Neigh.	H,S
		NO_2	81-91	SPM	Neigh.	H,S

30-087-0702 Company Site	MPC #2 Colstrip/Rosebud	TSP	72-91	SPM	Neigh.	H,S
		SO_2	81-91	SPM	Neigh.	H,S
		NO_2	81-91	SPM	Neigh.	H,S
30-087-0704 Company Site	MPC #4 Colstrip/Rosebud	TSP	77-91	SPM	Neigh.	H,S
		SO_2	77-91	SPM	Neigh.	H,S
		NO_2	77-91	SPM	Neigh.	H,S
30-087-XXXX Proposed Site	Ashland Area Ashland/Rosebud	PM-10	92	SLAMS	Neigh.	H,P
30-089-0003	Sanders Co. Courthouse Thompson Falls/Sanders	PM-10	85-91	SLAMS	Neigh.	H,P
30-093-0005	Greeley School Butte/Silver Bow	PM-10	85-91	SLAMS	Neigh.	H,P,S
30-093-0008	Butte - Greenhouse Butte/Silver Bow	PM-10	91	SLAMS	Neigh.	H,P
30-093-XXXX Proposed Site	Harrison & Int. 90 Butte/Silver Bow	CO	92	SLAMS	Micro.	H,P
30-111-0008	City Hall Billings/Yellowstone	TSP	71-91	SLAMS	Neigh.	H,P
30-111-0016 Company Site	BLAQTC - Laurel Laurel/Yellowstone	SO_2	87-91	SPM	Neigh.	H,S
30-111-0066	Coburn Road Billings/Yellowstone	SO_2	81-91	SLAMS	Neigh.	H,S

30-111-0075	Metra - 4th & Expo Billings/Yellowstone	CO	88-91	SLAMS	Micro.	H
30-111-0076	Ponderosa School Billings/Yellowstone	SO_2	89-91	SLAMS	Neigh.	P
30-111-0077	Federal Credit Union Billings/Yellowstone	PM-10	89-91	SLAMS	Micro.	H,P
30-111-1001	Laurel Jr. High Sch. Billings/Yellowstone	TSP	71-91	SLAMS	Neigh.	P
30-111-XXXX Proposed Site	24th St. W & Central Billings/Yellowstone	CO	92	SLAMS	Micro.	H,P
30-111-1065 Company Site	BLAQTC - Lockwood Park Billings/Yellowstone	SO_2	87-91	SPM	Neigh.	H,P,S
30-111-2005 Company Site	BLAQTC - Brickyard Lane Billings/Yellowstone	SO_2	89-91	SPM	Neigh.	H,P,S

TABLE 3

Montana Equipment Purchases for FY90

TABLE 3

MONTANA EQUIPMENT PURCHASES FOR FY90

Replacement Items

Quantity	Item Description	Each	Total
2	Dasibi CO Analyzers	$6,300	$12,600
4	WTC ICIS-3 Data Acquisition Systems	$3,416	$13,664
1	WTC ICIS-3 Card and Connection Panel for existing PC	$1,600	$1,600
15	GMW PM-10 Flow Controllers	$775	$11,625
1	Upgrade of Dasibi CO Analyzer SN 028	$791	$791
1	Upgrade of Dasibi CO Analyzer SN 034	$893	$893
1	Upgrade of Dasibi CO Analyzer SN 022	$699	$699
1	Upgrade of Dasibi CO Analyzer SN 031	$800	$800
	Total of Replacement Items		$42,672

New Equipment Items

3	Wedding PM-10 Samplers (Tribal) *	$4,063	$12,189
	Total of New Equipment Purchases		$12,189
	Total of Replacement and New Equipment		**$54,861**

* Ownership of these samplers has been transferred to the EPA - Montana Office for the tribal air monitoring program.

TABLE 4

Montana Equipment Purchases for FY91

TABLE 4

MONTANA EQUIPMENT PURCHASES FOR FY91

Replacement Items

Quantity	Item Description	Each	Total
4	EESI Dilution Systems	$5,391	$21,564
2	API SO_2 Analyzers	$7,992	$15,984
10	GMW PM-10 Flow Controllers	$780	$7,800
	Total of Replacement Items		$45,348
	New Equipment Purchases		
1	Lear Siegler CO Analyzer	$6,300	$6,300
3	WTC ICIS-3 Data Acquisition Systems	$3,416	$10,248
2	GMW PM-10 Head	$2,185	$4,370
2	GMW PM-10 Heads & Flow Controllers	$2,927	$5,854
2	EESI Dilution Systems	$5,391	$10,782
2	API SO_2 Analyzers	$7,992	$15,984
12	Portable PM-10 & CO Bag Samplers	$1,249	$14,988
	Total of New Equipment Purchases		$68,526
	Total of Replacement and New Equipment		**$113,874**

TABLE 5

Montana Equipment Replacement Plan

TABLE 5

MONITORING EQUIPMENT REPLACEMENT PLAN

AIRS Number / Ownership PAMS/EPA #	Site Name/Address City/County / Equipment Type	Model	Manufacturer	# of Units	Acq.Date	Condition	Rep.Cost	Proposed Replacement Costs FY-92	FY-93	FY-94	********** COMMENTS **********
30-013-0009	Fire Station #1 Great Falls/Cascade										
EPA Equipment	PM-10	321B	Sierra Anderson	2	≈10/84	Good	$8,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
30-013-1025	Skyway Conoco Great Falls/Cascade										
PAMS 2624	CO	3003	Dasibi	1	5/90	Good	$6,500	-----	-----	-----	
PAMS 2603	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	
PAMS 1221*	Met System	WM-III	Climatronics	1	≈4/79	Fair	$2,000	-----	-----	$2,000	* The wind system is not on the state inventory.
PAMS 1073	Dilution System	1009-MC	Dasibi	1	4/80	Good	$6,100	-----	-----	-----	
PAMS 1220	Shelter	-----	Snowy Mountain Trailer	1	8/73	Poor	$8,000	$8,000	-----	-----	
State Equipment	Recorder	-----	Leeds & Northrup	1	≈7/78	Fair	$3,000	$3,000	-----	-----	
30-029-0003	Col. Falls Jr. High Columbia Falls/ Flathead										
PAMS 2082, 2527, 2528, 2357, 2358	PM-10	-----	Wedding & Associates	3	2/87 3/88 7/89	Good	$12,000	-----	-----	-----	
30-029-0039	Marcus Foods Whitefish/Flathead										
EPA Equipment	PM-10	321B	Sierra Anderson	2	≈10/84	Good	$8,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
30-029-1015	Universal Athletics Kalispell/Flathead										
EPA Equipment	PM-10	321B	Sierra Anderson	3	≈10/84	Good	$12,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.

30-029-1017	Courthouse East Kallspell/Flathead										
PAMS 2338	Integrating Nephelometer	1550-B	Meteorology Research Inc.	1	6/88	Fair	$17,000	-----	-----	-----	MRI no longer makes nephelometers. Replacement analyzer would probably have to be a BAM or a TEOM.
State Equipment	Recorder	-----	Leeds & Northrup	1	≈7/78	Fair	$3,000	-----	-----	$3,000	
No equipment at present	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	-----	-----	$3,416	-----	-----	$3,416	Purchase a data acquisition system for this existing nephelometer site.
30-031-0002	East Main City Bldg. Bozeman/Gallatin										
EPA Equipment	PM-10	321B	Sierra Anderson	2	≈10/84	Good	$8,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
30-031-0008	Belgrade ConAgra Belgrade/Gallatin										
PAMS 2628, 2629	PM-10	1200	Sierra Anderson	2	10/90	Good	$8,000	-----	-----	-----	No current need to replace.
30-049-0001	Cogswell Building Helena/Lewis & Clark										
EPA Equipment	PM-10	321B	Sierra Anderson	1	≈10/84	Good	$4,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
30-049-0018	Lincoln School Helena/Lewis & Clark										
County Equipment	PM-10	321B	Sierra Anderson	2	≈6/88	Good	$4,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
PAMS 640	Integrating Nephelometer	1550-B	Meteorological Research Inc.	1	7/78	Fair	$17,000	-----	-----	-----	MRI no longer makes nephelometers. Replacement analyzer would probably have to be a BAM or a TEOM.
PAMS 1217*	Recorder	-----	Leeds & Northrup	1	≈9/74	Fair	$3,000	-----	-----	$3,000	* This recorder is not on the state inventory system.
PAMS 1183	Shelter	-----	Trailer (13 foot)	1	10/72	Poor	$8,000	-----	-----	-----	
PAMS 993	Met System	WM-III	Climatronics	1	5/80	Poor	$2,000	-----	-----	$2,000	
County Equipment	Data Acquisition System	CR10WP	Campbell	1	≈6/88	Good	$1,800	-----	-----	-----	
30-049-0714	Firehall East Helena/Lewis & Clark										
State Equipment	TSP	-----	General Metal Works	2	≈6/75	Good	$4,000	-----	-----	-----	

30-049-0719	Hadfield East Helena/Lewis & Clark										
Company Equipment	PM-10	1200	Sierra Anderson	2	7/88	Good	$8,000	-----	-----	-----	
State Equipment	TSP	-----	General Metal Works	2	≈6/75	Good	$4,000	-----	-----	-----	
30-049-0724	Dartman Field East Helena/Lewis & Clark										
State Equipment	TSP	-----	General Metal Works	2	≈6/75	Good	$4,000	-----	-----	-----	
30-049-0726	Old Railroad East Helena/Lewis & Clark										
State Equipment	TSP	-----	General Metal Works	2	≈6/75	Good	$4,000	-----	-----	-----	
30-053-0012	Lincoln Co. Courthouse Libby/Lincoln										
EPA Equipment	PM-10	321B	Sierra Anderson	4	≈10/84	Good	$16,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
30-053-0018	County Courthouse Annex Libby/Lincoln										
PAMS 1148	Integrating Nephelometer	1550-B	Meteorology Research Inc.	1	12/76	Fair	$17,000*	-----	-----	-----	* MRI no longer makes nephelometers. Replacement analyzer would probably have to be a BAM or a TEOM.
PAMS 2704	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	
State Equipment	Recorder	-----	Leeds & Northrup	1	≈7/78	Fair	$3,000	-----	-----	-----	
30-053-0019	Troy School Troy/Lincoln										
PAMS 2693, 2694	PM-10	1200	Sierra Anderson	2	3/91	Good	$8,000	-----	-----	-----	
30-053-1005	Lincoln Electric Co-op Eureka/Lincoln										
EPA Equipment	PM-10	321B	Sierra Anderson	2	≈10/84	Good	$8,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.

30-063-0005	Malfunction Junction Missoula/Missoula										
PAMS 2623	CO	3003	Dasibi	1	5/90	Good	$6,500	-----	-----	-----	No current need to replace.
PAMS 2605	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	
PAMS 1007?	Met System	WM-III	Climatronics	1	≈10/76	Fair	$2,000	-----	-----	$2,000	
PAMS XXXX*	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	1/92	Good	$6,000	-----	-----	-----	* A purchase order has been issued for the dilution sampler but they have not been received to date.
EPA Equipment	Shelter	-----	RAPS/RAM shelter	1	≈6/75	Fair	$8,000	-----	-----	-----	No current need to replace. Missoula county has insulated this shelter and it is at a long-term location.
PAMS 1229*	Recorder	-----	Leeds & Northrup	1	≈12/76	Fair	$3,000	$3,000	-----	-----	* This recorder is not on the state inventory system.
30-063-0024	Boyd Park Missoula/Missoula										
County Equipment	PM-10	321B	Sierra Anderson	3	≈10/84	Good	$12,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
County Equipment	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	
County Equipment	Beta Attenuation Monitor	102	MDA Scientific, Inc.	1	?	Good	$17,000	-----	-----	-----	
EPA Equipment	Shelter	-----	RAPS/RAM shelter	1	≈6/75	Fair	$8,000	-----	-----	-----	No current need to replace. Missoula county has insulated this shelter and it is at a long-term location.
30-063-0031	Health Dept. Roof Missoula/Missoula										
EPA Equipment	PM-10	321B	Sierra Anderson	2	≈10/84	Good	$8,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
30-089-0003	Sanders Co. Courthouse Thompson Falls/Sanders										
EPA Equipment	PM-10	321B	Sierra Anderson	3	≈10/84	Good	$12,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.

30-093-0005	Greeley School Butte/Silver Bow										
EPA Equipment	PM-10	321B	Sierra Anderson	1	≈10/84	Good	$4,000	-----	-----	-----	No current need to replace. Mass flow controllers were replaced with volumetric flow controllers between 8/89 and 10/90.
PAMS 523	Integrating Nephelometer	1550-B	Meteorology Research Inc.	1	4/78	Fair	$17,000*	-----	-----	-----	* MRI no longer makes nephelometers. Replacement analyzer would probably have to be a BAM or a TEOM.
PAMS 2685	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	
EPA Equipment	Recorder	-----	Leeds & Northrup	1	≈7/78	Fair	$3,000	-----	$3,000	-----	
EPA Equipment	Shelter	-----	RAPS/RAM shelter	1	≈6/75	Fair	$8,000	-----	-----	-----	No current need to replace. The department reinsulated the shelter on 9/91 and the shelter roof is used as a platform for PM-10s.
30-093-0008	Butte - Greenhouse Butte/Silver Bow										
PAMS 2520, 2521	PM-10	1200	Sierra Anderson	2	6/89	Good	$8,000	-----	-----	-----	
30-111-0008	City Hall Billings/Yellowstone										
County Equipment	TSP	-----	Sierra Anderson	2	≈6/71	Good	$4,000	-----	-----	-----	
30-111-0066	Coburn Road Billings/Yellowstone										
PAMS 2687	SO_2	100	Advanced Pollution Instrumentation, Inc.	1	3/91	Good	$8,000	-----	-----	-----	No current need to replace.
BLAQTC equipment	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	8/89	Good	$3,416	-----	-----	-----	
PAMS 1242	Met System	Main-frame	Climatronics	1	4/79	Fair	$2,000	-----	-----	$2,000	
PAMS 2689	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	3/91	Good	$6,000	-----	-----	-----	
PAMS 1386	Shelter	-----	Snowy Mountain Trailer	1	8/73	Poor	$8,000	-----	$8,000	-----	
State Equipment	Recorder	-----	Leeds & Northrup	1	≈7/78	Fair	$3,000	-----	$3,000	-----	

30-111-0075	Metra - 4th & Expo Billings/Yellowstone										
PAMS 1423	CO	3003	Dasibi	1	4/81	Good	$6,500	-----	-----	-----	This analyzer was upgraded and rebuilt in 1990.
PAMS 2604	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	
PAMS 520	Met System	WM-III	Climatronics	1	4/78	Fair	$2,000	-----	-----	$2,000	
PAMS XXXX*	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	1/92	Good	$6,000	-----	-----	-----	* A purchase order has been issued for the dilution sampler but they have not been received to date.
PAMS 1115	Shelter	-----	Snowy Mountain Trailer	1	8/73	Poor	$8,000	$8,000	-----	-----	
PAMS 1117	Recorder	-----	Leeds & Nortrup	1	9/74	Fair	$3,000	$3,000	-----	-----	
30-111-0076	Ponderosa School Billings/Yellowstone										
PAMS 2688	SO_2	100	Advanced Pollution Instrumentation, Inc.	1	3/91	Good	$8,000	-----	-----	-----	No current need to replace.
PAMS 2606	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	
PAMS 1247	Met System	Main-frame	Climatronics	1	4/79	Fair	$2,000	-----	-----	$2,000	
PAMS 2690	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	3/91	Good	$6,000	-----	-----	-----	
EPA Equipment	Shelter	-----	RAPS/RAM shelter	1	≈6/75	Poor	$8,000	-----	$8,000	-----	
PAMS 0868*	Recorder	-----	Leeds & Northrup	1	≈2/76	Fair	$3,000	-----	$3,000	-----	* Not on state inventory system.
30-111-0077	Federal Credit Union Billings/Yellowstone										
County Equip. (1) State Equip. (1)	PM-10	-----	Wedding & Associates	2	8/89 7/88	Good	$8,000	-----	-----	-----	One PM-10 is owned by the state and the other is owned by the county.
30-111-1001	Laurel Jr. High Sch. Billings/Yellowstone										
County Equipment	TSP	-----	Sierra Anderson	1	≈6/71	Good	$2,000	-----	-----	-----	
TOTALS								$25,000	$25,000	$21,416	

TABLE 6

Monitoring Network Spare Equipment Inventory (Partial List)

TABLE 6

MONITORING NETWORK SPARE EQUIPMENT INVENTORY (PARTIAL LIST)

Ownership PAMS/EPA #	Equipment Type	Model	Manufacturer	# of Units	Acq.Date	Condition	Rep.Cost	Proposed Replacement Costs FY-92	FY-93	FY-94	********** COMMENTS **********
PAMS 545, 546	SO_2	43	TECO	2	6/78	Fair	$16,000	-----	-----	-----	
PAMS 603	SO_2	43	TECO	1	3/79	Fair	$8,000	-----	-----	-----	
PAMS 852, 853, 1221	SO_2	43	TECO	3	10/79	Fair	$24,000	-----	-----	-----	
PAMS 992	SO_2	43	TECO	1	5/80	Fair	$8,000	-----	-----	-----	
PAMS 1113	SO_2	43	TECO	1	9/79	Fair	$8,000	-----	-----	-----	
PAMS 1162	SO_2	43	TECO	1	6/79	Fair	$8,000	-----	-----	-----	
PAMS 1787	SO_2	43	TECO	1	5/85	Fair	$8,000	-----	-----	-----	
PAMS 566, 568, 569, 1021, 1227	Dichotomous Sampler	-----	Sierra Anderson	5	9/78	Fair	$20,000	-----	-----	-----	These samplers are used for PM-10 source apportionment studies.
PAMS 604	Dichotomous Sampler	-----	Sierra Anderson	1	3/79	Fair	$4,000	-----	-----	-----	These samplers are used for PM-10 source apportionment studies.
PAMS 1169, 1170	Dichotomous Sampler	-----	Sierra Anderson	2	10/79	Fair	$8,000	-----	-----	-----	These samplers are used for PM-10 source apportionment studies.
PAMS 1123	Integrating Nephelometer	1550-B	Meteorology Research Inc.	1	12/76	Fair	$17,000*	-----	-----	-----	* MRI no longer makes nephelometers. Replacement analyzer would probably have to be a BAM or a TEOM.
PAMS 1133	Integrating Nephelometer	1550-B	Meteorology Research Inc.	1	8/73	Fair	$17,000*	-----	-----	-----	* MRI no longer makes nephelometers. Replacement analyzer would probably have to be a BAM or a TEOM.
PAMS 1397	CO	3003	Dasibi	1	3/81	Good	$6,500	-----	-----	-----	Serial number 022. This analyzer was upgraded and rebuilt in 1990.
PAMS 1425	CO	3003	Dasibi	1	4/81	Good	$6,500	-----	-----	-----	Serial number 031. This analyzer was upgraded and rebuilt in 1990.
PAMS 1429	CO	3003	Dasibi	1	5/81	Good	$6,500	-----	-----	-----	Serial number 034. This analyzer was upgraded and rebuilt in 1990.
PAMS 2279, 2280	Data Acquisition System	CR10WP	Campbell	2	2/88	Good	$3,600	-----	-----	-----	New Campbell DAS's but have not ever been used.
PAMS 2529, 2530, 2531, 2532, 2533, 2524	Dichotomous PM-10 Inlet heads	-----	Sierra Anderson	6	8/89	Good	$7,200	-----	-----	-----	New heads to replace PM-15 heads on dichotomous samplers. Used for source apportionment studies.
PAMS 2701, 2702	SO_2	100	Advanced Pollution Instrumentation, Inc.	2	8/91	Good	$16,000	-----	-----	-----	These are new SO_2 analyzers that are intended for spares.

PAMS 2726	CO	8830?	Monitor Labs	1	8/91	Good	$6,300	-----	-----	-----	This is a new CO analyzer that is used as a spare and as an extra analyzer for saturation studies.
PAMS 2057	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	11/86	Good	$6,000	-----	-----	-----	This dilution system is used for auditing continuous analyzers.
State Equipment	CO & PM-10 portable samplers	-----	Lane County	12	8/91	Good	$15,000	-----	-----	-----	These samplers will be used for CO and PM-10 for saturation studies.
PAMS 2703	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	6/90	Good	$3,416	-----	-----	-----	This data acquisition system is used by the electronics specialist.

TABLE 7

Monitoring Equipment Purchase Plan for New Sites

TABLE 7

MONITORING EQUIPMENT PURCHASE PLAN FOR NEW SITES

AIRS Number	Site Name/Address City/County							Proposed Replacement Costs			
Ownership PAMS/EPA #	Equipment Type	Model	Manufacturer	# of Units	Acq.Date	Condition	Rep.Cost	FY-92	FY-93	FY-94	********** COMMENTS **********
30-093-XXXX	Harrison & Int. 90 Butte/Silver Bow										
New Equipment	CO	-----	Monitor Labs or equivalent	1	-----	New	$6,500	-----	-----	-----	Existing spare Dasibi 3003 analyzer could temporarily used for this site.
New Equipment	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	-----	New	$3,416	-----	-----	-----	
New Equipment	Met System	-----	Climatronics	1	-----	New	$3,000	-----	-----	-----	
New Equipment	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	-----	New	$6,000	-----	-----	-----	
New Equipment	Shelter	-----	-----	1	-----	New	$5,000	-----	-----	-----	
New Equipment	Recorder	-----	Leeds & Northrup	1	-----	New	$3,000	-----	-----	-----	
30-111-XXXX	24th St. W & Central Billints/Yellowstone										
New Equipment	CO	-----	Monitor Labs or equivalent	1	-----	New	$6,500	-----	-----	-----	Existing spare Dasibi 3003 analyzer could temporarily used for this site.
New Equipment	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	-----	New	$3,416	-----	-----	-----	
New Equipment	Met System	-----	Climatronics	1	-----	New	$3,000	-----	-----	-----	
New Equipment	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	-----	New	$6,000	-----	-----	-----	
New Equipment	Shelter	-----	-----	1	-----	New	$5,000	-----	-----	-----	
New Equipment	Recorder	-----	Leeds & Northrup	1	-----	New	$3,000	-----	-----	-----	

30-111-XXXX	Idaho and Main St. Kalispell/Flathead										
New Equipment	CO	-----	Monitor Labs or equivalent	1	-----	New	$6,500	-----	-----	-----	Existing spare Dasibi 3003 analyzer could temporarily used for this site.
New Equipment	Data Acquisition System	ICIS-3	Western Telecomputing Corporation	1	-----	New	$3,416	-----	-----	-----	
New Equipment	Met System	-----	Climatronics	1	-----	New	$3,000	-----	-----	-----	
New Equipment	Dilution System	3000	Enviro Electronic Service Inc. (EESI)	1	-----	New	$6,000	-----	-----	-----	
New Equipment	Shelter	-----	-----	1	-----	New	$5,000	-----	-----	-----	
New Equipment	Recorder	-----	Leeds & Northrup	1	-----	New	$3,000	-----	-----	-----	
30-001-XXXX	Industrial Area Dillon/Beaverhead										
New Equipment	PM-10	1200	Sierra Anderson	2	-----	New	$5,000	-----	-----	-----	Cost would include PM-10 heads, retrofit kits and volumetric flow controllers.
30-043-XXXX	Clancy Area Clancy/Jefferson										
New Equipment	PM-10	1200	Sierra Anderson	2	-----	New	$5,000	-----	-----	-----	Cost would include PM-10 heads, retrofit kits and volumetric flow controllers.
30-087-XXXX	Ashland Area Ashland/Rosebud										
New Equipment	PM-10	1200	Sierra Anderson	2	-----	New	$5,000	-----	-----	-----	Cost would include PM-10 heads, retrofit kits and volumetric flow controllers.

TABLE 8

Montana Network Modification Goals for FY91

TABLE 8

MONTANA NETWORK MODIFICATIONS GOALS FOR FY91

PRI	AIRS Number	Site Name/Address City/County	Parm	********** Comments **********
1.	30-049-0001	Cogswell Building Helena/Lewis & Clark	PM-10	Decrease sampling frequency from every other day to once every six days.
	Status:	Changed frequency on 10-1-90.		
2.	30-111-XXXX	Yellowstone County	SO4--	Discontinue sulfation rate analyses in Yellowstone County.
	Status:	Yellowstone county discontinued sending the department their sulfation rate data at the end of 1990 but continue to run them for their own purposes.		
3.	30-019-XXXX	Daniels County	SO4--	Discontinue sulfation rate analyses in Daniels County.
	Status:	The department discontinued their sulfation sites at the end of 1990.		
4.	30-111-0008	City Hall	TSP	Discontinue TSP site at the end of 1990.
	Status:	Yellowstone county continued to operate the site in 1991.		
5.	30-111-1001	Laurel Jr. High Sch. Laurel/Yellowstone	TSP	Discontinue TSP site at the end of 1990.
	Status:	Yellowstone county continued to operate the site in 1991.		

6.	30-029-XXXX	Downtown Whitefish Whitefish/Flathead	PM-10	Establish a PM-10 site in downtown Whitefish.
	Status:	A PM-10 site was installed at the Marcus Foods (30-029-0039) on 4-30-91.		
7.	30-093-XXXX	Harrison & Int. 90 Butte/Silver Bow	CO	Establish a CO site near the intersection of Harrison and Interstate 90 in Butte in 1991.
	Status:	The establishment of this CO site is on hold pending a future CO saturation study.		
8.	30-031-0002	East Main City Bldg. Bozeman/Gallatin	PM-10	Increase sampling from 1-in-6 days to every other day during the first and fourth quarters.
	Status:	A second PM-10 was installed on 1-11-91. Every other day sampling started after that date for the first and fourth quarters.		
9.	30-093-XXXX	Harrison Avenue Area Butte/Silver Bow	PM-10	Establish a PM-10 site in the maximum emission grid near Harrison Avenue and Interstate 90 during the fall of 1991.
	Status:	The establishment of this CO site is on hold pending a future CO saturation study.		
10.	30-111-XXXX	24th St. W & Central Billings/Yellowstone	CO	Establish a CO site near 24th Street W. and Central on the west end of Billings.
	Status:	The establishment of this CO site is on hold pending a CO saturation study.		
11.	30-111-0065	Lockwood Park Billings/Yellowstone	PM-10	Collect PM-10 data at the Lockwood Park SO_2 site in Billings for a special health-effects study during the fall and winter of 1990-91.
	Status:	PM-10 samplers were installed at this site and ran from 12-1-90 until 3-11-91.		

12.	30-031-XXXX	Belgrade Residential Belgrade/Gallatin	PM-10	Establish a PM-10 site in Belgrade during the spring or summer of 1991.

Status: PM-10 samplers were installed at the ConAgra site (30-031-XXXX) on 10-8-91.

13.	30-029-XXXX	Idaho and Main St. Kalispell/Flathead	CO	Establish a CO site in Kalispell in 1992.

Status: The establishment of this CO site is on hold pending a future CO saturation study.

TABLE 9

Montana Network Modification Goals for FY92

TABLE 9

MONTANA NETWORK MODIFICATIONS GOALS FOR FY92

PRI	AIRS Number	Site Name/Address City/County	Parm	********** Comments **********
1.	30-013-XXXX	Cascade County Health Department/Great Falls	PM-10	Transfer PM-10 weighings and calculations from county lab to state lab starting October 1, 1991.
2.	30-111-0008	City Hall Billings/Yellowstone	TSP	Discontinue TSP site at the end of 1991.
3.	30-049-XXXX	Lewis & Clark County Health Department/ Helena	PM-10	Transfer PM-10 weighings and calculations from county lab to state lab starting October 1, 1991.
4.	30-111-XXXX	Yellowstone County Air Pollution Control/ Billings	PM-10	Transfer PM-10 weighings and calculations from county lab to state lab starting October 1, 1991.
5.	30-043-0903	Microwave Montana City/Jefferson	TSP/Pb	Discontinue TSP and Pb monitoring on 7-1-91.
6.	30-013-XXXX	Saturation Study Great Falls/Cascade	CO	Conduct a saturation study during January 1992.
7.	30-111-XXXX	Saturation Study Billings/Yellowstone	CO	Conduct a saturation study during December 1991.
8.	30-111-1001	Laurel Jr. High Sch. Laurel/Yellowstone	TSP	Discontinue TSP site at the end of 1991.
9.	30-049-0018	Lincoln School Helena/Lewis & Clark	PM-10	Establish this county site as a reporting SLAMS site starting on October 1, 1991.

10.	30-111-0077	Federal Credit Union Billings/Yellowstone	PM-10	Operate collocated PM-10 until December 31, 1991 then operate the site on a 1-in-3 day schedule with two samplers.
11.	30-053-0012	Lincoln Co. Courthouse Libby/Lincoln	PM-10	Reduce sampling frequency from every day to every one-in-six days starting 4-1-92.
12.	30-053-0018	County Courthouse Annex Libby/Lincoln	B-Scat	Install new ICIS-3 Data Acquisition System at the Libby nephelometer site.
13.	30-093-0005	Greeley School Butte/Silver Bow	B-Scat	Install new ICIS-3 Data Acquisition System at the Butte nephelometer site.
14.	30-053-0019	Troy School Troy/Lincoln	PM-10	Establish a PM-10 site in the town of Troy.
15.	30-063-0005	Malfunction Junction Missoula/Missoula	CO	Request shut down of the CO site during the summer and fall of 1992.
16.	30-049-0719	Hadfield East Helena/Lewis & Clark	TSP/Pb	Keep the collocated TSP/Pb monitor at Hadfield rather than move it to Firehall.
17.	30-093-XXXX	Harrison & Int. 90 Butte/Silver Bow	CO	Establish a CO site near the intersection of Harrison and Interstate 90 in Butte in 1992.
18.	30-023-0010	Teressa Ann Terrace Anaconda/Deer Lodge	PM-10	Reduce sampling frequency from every other day to 1-in-6 after consultation with Superfund personnel.
19.	30-049-0726 and 30-049-1002	Old Railroad and Hastie East Helena/Lewis & Clark	TSP/Pb	Move Old Railroad TSP/Pb site to a maximum concentration site in the area of the old Hastie site as determined by dispersion modeling.
20.	30-111-XXXX	24th St. W & Central Billings/Yellowstone	CO	Establish a CO site near 24th Street W. and Central on the west end of Billings.

21.	30-001-XXXX	Industrial Area Dillon/Beaverhead	PM-10	Establish a PM-10 site near the industrial area south of Dillon during the summer of 1992.
22.	30-053-1005	Lincoln Electric Co-op Eureka/Lincoln	PM-10	Relocate Eureka PM-10 site nearer the center of town in response to citizen's complaints.
23.	30-029-XXXX	New Met Site Columbia Falls/Flathead	Met	Install a new meteorological site in Columbia Falls if required for modeling purposes.
24.	30-029-1017	Courthouse East Kalispell/Flathead	B-Scat	Purchase/install new ICIS-3 Data Acquisition System at the Kalispell nephelometer site.
25.	30-029-XXXX	Idaho and Main St. Kalispell/Flathead	CO	Establish a CO site in Kalispell in 1992.
26.	30-043-XXXX	Clancy Area Clancy/Jefferson	PM-10	Establish a PM-10 site at the north end of Jefferson County during the fall of 1992.
27.	30-087-XXXX	Ashland Area Ashland/Rosebud	PM-10	Establish a PM-10 site in Ashland during the fall of 1992.
28.	30-013-1025	Skyway Conoco Great Falls/Cascade	CO	Purchase a replacement shelter for this CO site.
29.	30-013-1025	Skyway Conoco Great Falls/Cascade	CO	Purchase a replacement shelter for this CO site.
30.	30-013-1025	Skyway Conoco Great Falls/Cascade	CO	Purchase a replacement recorder for this CO site.
31.	30-063-0005	Malfunction Junction Missoula/Missoula	CO	Purchase a replacement recorder for this CO site.
32.	30-111-0075	Metra - 4th & Expo Billings/Yellowstone	CO	Purchase a replacement shelter for this CO site.
33.	30-111-0075	Metra - 4th & Expo Billings/Yellowstone	CO	Purchase a replacement recorder for this CO site.

APPENDIX B

Emission Inventory Data for 1989

EMISSION INVENTORY DATA FOR 1989

This appendix presents emission inventory data for 1989 from the major point sources throughout Montana. The information is sorted by Air Quality Control Region (AQCR) and county. The department uses point, area and mobile source emission inventory data to assess the adequacy of the air monitoring network and determine if additional sites are needed.

EMISSION INVENTORY DATA FOR 1989
TONS PER YEAR

COUNTY	AQCR	PLANT	SOURCE	POLLUTANTS: SUSPENDED PARTIC.	SULFUR DIOXIDE	NITROGEN DIOXIDE	VOLATILE ORG COMP.	CARBON MONOXIDE
AQCR 140								
Big Horn County (0060)								
0060	140	4	WEST DECKER COAL	829	21	258	36	368
0060	140	2	WESTMORELAND RESOURCES	622	25	192	22	268
0060	140	3	NERCO-SPRING CREEK COAL	737	11	130	19	216
0060	140	1	EAST DECKER COAL	581	21	249	33	269
Total for County				2769	78	829	110	1121
Carbon County (0180)								
0180	140	1	MONTANA LIMESTONE CO.	0	0	0	0	0
Total for County				0	0	0	0	0
Fergus County (0460)								
0460	140	4	CENTURY PAVING-LEWISTOWN	0	0	0	0	0
0460	140	5	KENDALL VENTURE	165	6	94	8	20
Total for County				165	6	94	8	20
Stillwater County (1540)								
1540	140	1	STILLWATER MINE-NYE	56	4	52	5	22
Total for County				56	4	52	5	22
Yellowstone County (1720)								
1720	140	15	MONT. POWER CORETTE	939	7244	2955	22	189
1720	140	12	FARMERS CENEX/UNION	419	7598	722	6705	124
1720	140	11	CONOCO	334	3152	919	1062	137
1720	140	14	MONTANA SULPHUR	0	3634	4	0	1
1720	140	7	WESTERN SUGAR	145	141	421	3	142
1720	140	10	EMPIRE SAND & GRAVEL	6	0	0	0	0
1720	140	13	EXXON CO. USA	1059	12383	6685	3414	126
1720	140	2	MIDLANT O'LEARY	18	0	0	0	0
1720	140	6	CEREAL FOOD PROCESSORS	219	0	1	0	0
Total for County				3139	34152	11707	11206	719
Total for AQCR 140				6129	34240	12682	11329	1882

EMISSION INVENTORY DATA FOR 1989
TONS PER YEAR

COUNTY	AQCR	PLANT	SOURCE	POLLUTANTS: SUSPENDED PARTIC.	SULFUR DIOXIDE	NITROGEN DIOXIDE	VOLATILE ORG COMP.	CARBON MONOXIDE
AQCR 141								
Cascade County (0220)								
0220	141	1	INTERSTATE SPECIALTIES	43	0	0	0	0
0220	141	7	BIG SKY FEED & SUPPLY	1	0	0	0	0
0220	141	16	MALMSTROM AFB	2	7	62	0	20
0220	141	12	CONAGRA FEEDS	9	0	1	0	0
0220	141	14	MDOH ASPHALT	1	0	0	0	0
0220	141	15	GTA FEEDS	59	0	1	0	0
0220	141	4	MONTANA REFINING CO.	9	2150	63	1160	475
0220	141	10	G.F. CITY ASPHALT PLANT	1	0	0	0	0
0220	141	11	UNITED MATERIALS (E&W)	61	1	0	0	0
0220	141	3	GENERAL MILLS	40	0	1	0	0
0220	141	13	CEREAL FOOD PROC. G.FALLS	63	0	1	0	0
0220	141	9	HARVEST STATES COOP.	1	0	0	0	0
Total for County				290	2158	129	1160	495
Glacier County (0560)								
0560	141	4	MPC COMPRSSOR	1	0	287	132	91
Total for County				1	0	287	132	91
Teton County (1560)								
1560	141	1	GYPSY HIGHVIEW	0	61	0	0	0
Total for County				0	61	0	0	0
Toole County (1580)								
1580	141	1	NORTHERN MONTANA GAS	0	132	0	0	0
Total for County				0	132	0	0	0
Total for AQCR 141				291	2351	416	1292	586

EMISSION INVENTORY DATA FOR 1989
TONS PER YEAR

COUNTY	AQCR	PLANT	SOURCE	POLLUTANTS: SUSPENDED PARTIC.	SULFUR DIOXIDE	NITROGEN DIOXIDE	VOLATILE ORG COMP.	CARBON MONOXIDE
AQRC 142								
Beaverhead County (0040)								
0040	142	1	STOLTZE LAND & LBR/DILLON	107	0	2	8	98
0040	142	2	PFIZER, INC.-DILLON	120	0	17	0	4
Total for County				227	0	19	8	102
Broadwater County (0140)								
0140	142	2	CONTINENTAL LIME, INC.	448	379	208	4	149
Total for County				448	379	208	4	149
Gallatin County (0520)								
0520	142	1	PIONEER READY MIX/BOZEMAN	517	6	2	2	1
0520	142	5	IDEAL BASIC-TRIDENT	217	379	523	0	4
0520	142	2	A.E. MONTANA-AMSTERDAM	0	0	0	0	0
0520	142	6	CYPRUS MILL-THREE FORKS	102	0	9	0	3
0520	142	8	MT TALC MILL-SAPPINGTON	39	0	0	0	0
0520	142	4	PLUM CREEK MFG., BELGRADE	505	4	77	39	110
0520	142	7	KANTA PROD. THREE FORKS	14	0	0	0	0
Total for County				1394	389	611	41	118
Jefferson County (0760)								
0760	142	3	MONTANA TUNNELS/PEGASUS	340	37	435	37	314
0760	142	1	ASH GROVE CEMENT WEST INC.	1761	327	1504	1	6
0760	142	2	GOLDEN SUNLIGHT MINE	1536	4	447	12	116
Total for County				3637	368	2386	50	436
Lewis and Clark County (0860)								
0860	142	1	ASARCO, INC.-EAST HELENA	302	28154	0	0	13192
0860	142	6	BASIN CREEK MINE-RAMINI	400	10	20	5	35
0860	142	3	AMERICAN CHEMET-E. HELENA	14	0	0	0	0
0860	142	5	HELENA SAND & GRAVEL	35	1	0	1	0
Total for County				751	28165	20	6	13227
Madison County (1000)								
1000	142	2	MT TALC/JOHNNY GULCH MINE	386	0	0	0	0
1000	142	1	CYPRUS-YELLOWSTONE MINE	607	0	0	0	0
1000	142	3	CYPRUS-MP MINE	32	0	5	0	8
Total for County				1025	0	5	0	8

EMISSION INVENTORY DATA FOR 1989
TONS PER YEAR

COUNTY	AQCR	PLANT	SOURCE	POLLUTANTS: SUSPENDED PARTIC.	SULFUR DIOXIDE	NITROGEN DIOXIDE	VOLATILE ORG COMP.	CARBON MONOXIDE
Meagher County (1020)								
1020	142	1	ALCOTECH-RINGLING	19	0	0	13	0
Total for County				19	0	0	13	0
Park County (1160)								
1160	142	3	PARK LUMBER	11	0	2	17	195
1160	142	1	BRAND S LUMBER	104	0	0	0	0
1160	142	2	PARK CO. REFUSE DIST INCIN	5	16	19	9	221
1160	142	4	MINERAL HILL MINE	36	3	22	2	10
Total for County				156	19	43	28	426
Powell County (1260)								
1260	142	1	COMINCO AMERICAN	73	0	0	0	0
1260	142	2	LOUISIANA PAC. DEER LODGE	66	2	8	14	40
Total for County				139	2	8	14	40
Silver Bow County (1480)								
1480	142	9	MONTANA RESOURCES	3235	40	472	43	197
1480	142	6	RITEWAY ASPHALT CO.	4	0	0	0	0
1480	142	7	BUTTE-SILVER BOW ASPHALT	3	0	0	0	0
1480	142	5	RHONE-POULENC-RAMSAY	112	1262	33	1	8
1480	142	11	BEAL MTN/PEGASUS	710	13	132	9	70
1480	142	8	GILMAN EXCAVATING INC.	1	0	0	0	0
Total for County				4065	1315	637	53	275
Total for AQCR 142				11861	30637	3937	217	14781

EMISSION INVENTORY DATA FOR 1989
TONS PER YEAR

COUNTY	AQCR	PLANT	SOURCE	POLLUTANTS: SUSPENDED PARTIC.	SULFUR DIOXIDE	NITROGEN DIOXIDE	VOLATILE ORG COMP.	CARBON MONOXIDE
AQCR 143								
Dawson County (0360)								
0360	143	2	CENTURY CONST.-GLENDIVE	56	0	0	0	0
Total for County				56	0	0	0	0
Phillips County (1200)								
1200	143	2	LANDUSKY MINING CO.	439	0	0	0	0
1200	143	1	ZORTMAN MINING CO.	284	0	0	0	0
Total for County				723	0	0	0	0
Richland County (1320)								
1320	143	2	HOLLY SUGAR	95	270	231	76	142
1320	143	6	WESTERN GAS PROCESSORS	0	40	0	0	0
1320	143	4	KOCH HYDROCARBON	0	0	0	0	0
1320	143	5	KNIFE RIVER COAL MINING	131	1	18	2	17
1320	143	3	MONT.-DAKOTA UTIL./SIDNEY	242	969	941	8	71
1320	143	1	COASTAL OIL & GAS	0	691	407	0	774
Total for County				468	1971	1597	86	1004
Rosebud County (1360)								
1360	143	5	MONT. POWER COLSTRIP 3	1264	2097	15191	110	947
1360	143	3	MONT. POWER COLSTRIP 2	422	2992	4415	49	424
1360	143	6	MONT. POWER COLSTRIP 4	1357	2302	16858	119	1017
1360	143	4	WESTERN ENERGY-ROSEBUD	2483	44	522	67	533
1360	143	1	PEABODY COAL	549	43	514	68	585
1360	143	2	MONT. POWER COLSTRIP 1	465	2356	4943	48	415
Total for County				6540	9834	42443	461	3921
Total for AQCR 143				7787	11805	44040	547	4925

EMISSION INVENTORY DATA FOR 1989
TONS PER YEAR

COUNTY	AQCR	PLANT	SOURCE	POLLUTANTS: SUSPENDED PARTIC.	SULFUR DIOXIDE	NITROGEN DIOXIDE	VOLATILE ORG COMP.	CARBON MONOXIDE
AQCR 144								
Flathead County (0480)								
0480	144	3	AMERICAN TIMBER-OLNEY	219	1	26	13	37
0480	144	8	PLUM CREEK, COL. FALLS	498	10	157	86	257
0480	144	17	FLATHEAD COUNTY ASPHALT	65	2	1	1	1
0480	144	6	KLINGER LUMBER	19	0	2	24	281
0480	144	12	COLUMBIA FALLS ALUMINUM	20	1455	7	92	322
0480	144	10	STOLTZE LAND/LBR, C.FALLS	214	2	39	20	56
0480	144	19	B&J LUMBER	18	0	2	4	44
0480	144	5	PLUM CREEK, EVERGREEN	40	4	80	50	114
0480	144	16	NUPAC (PACK & CO.)	78	1	0	1	0
Total for County				1171	1475	314	291	1112
Lake County (0820)								
0820	144	2	PLUM CREEK LUMBER, PABLO	393	182	67	20	58
0820	144	1	PACK RIVER LUMBER CO.	225	0	6	4	71
Total for County				618	182	73	24	129
Lincoln County (0940)								
0940	144	2	PLUM CREEK-FORTINE	24	2	32	16	46
0940	144	3	ASARCO-TROY	95	0	0	0	0
0940	144	4	CHAMPION-LIBBY	558	20	370	196	528
0940	144	1	OWENS & HURST LUMBER CO.	40	0	0	0	0
Total for County				717	22	402	212	574
Mineral County (1060)								
1060	144	3	NORTHWESTERN LBR & CEDAR	0	0	0	0	0
1060	144	1	DAW FOREST PRODUCTS, SUPER	33	2	34	17	49
Total for County				33	2	34	17	49

EMISSION INVENTORY DATA FOR 1989
TONS PER YEAR

COUNTY	AQCR	PLANT	SOURCE	POLLUTANTS: SUSPENDED PARTIC.	SULFUR DIOXIDE	NITROGEN DIOXIDE	VOLATILE ORG COMP.	CARBON MONOXIDE
Missoula County (1100)								
1100	144	10	CITY OF MISSOULA ASPHALT	1	0	0	0	0
1100	144	4	PYRAMID MOUNTAIN LUMBER	66	1	12	6	17
1100	144	1	CHAMPION-BONNER	415	1	17	10	25
1100	144	11	MISSOULA COUNTY ASPHALT	3	0	0	0	0
1100	144	8	MISSOULA WHITE PINE	141	2	13	6	18
1100	144	6	STONE CONTAINER	508	155	1483	573	4061
1100	144	2	LOUISIANA PAC. PART. BOARD	192	3	56	24	70
1100	144	7	WESTERN MATERIALS INC.	20	2	1	1	1
1100	144	9	AMERICAN ASPHALT	14	0	0	0	0
1100	144	3	MONTANA WOOD SPECIALTIES	76	1	24	12	34
1100	144	12	JENSEN PAVING CO.	86	1	0	0	0
Total for County				1522	166	1606	632	4226
Ravalli County (1300)								
1300	144	1	STOLTZE-CONNER LUMBER	108	1	22	11	31
1300	144	2	DARBY LUMBER CO.	29	2	32	16	46
Total for County				137	3	54	27	77
Sanders County (1400)								
1400	144	3	THOMPSON RIVER LUMBER	136	2	19	26	217
1400	144	5	WATTERS BROS. LUMBER	0	0	0	0	3
1400	144	4	W.I. FOREST PRODUCTS	118	0	7	30	283
Total for County				254	2	26	56	503
Total for AQCR 144				4452	1852	2509	1259	6670
Total for State				30520	80885	63584	14644	28844

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